

A REVISION OF THE NORTH AMERICAN SPECIES OF  
ICHNEUMON-FLIES BELONGING TO THE GENUS  
APANTELES.

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INTRODUCTION.

The work herewith presented is the result of studies made in the United States National Museum at Washington during the summer of 1919 while the writer was under temporary appointment in the Bureau of Entomology. More or less contributory data had been gathered in the course of a previous appointment in the Bureau of Entomology, at the Gipsy Moth Laboratory, at Melrose Highlands, Massachusetts, and some information had been brought together during the winter and spring of 1918-19 at Cornell University. But it was not until the great mass of valuable material in the collection of the United States National Museum had been worked over that an understanding of the North American species of this large and important genus was possible.

Of the 164 species recognized in this paper 136 are represented in the United States National Museum by type, cotype, or paratype specimens, and only 14 are entirely unrepresented by authentic material; the holotypes of 119 species are deposited here, including those of 36 new species, which are described in this work. Types of 8 of Ashmead's West Indian species are in the British Museum and have not been seen; nor have those of 4 other West Indian species described by Cresson, which are deposited in the Academy of Sciences at Philadelphia. The Provancher Collection, in the Museum of Public Instruction at Quebec, Canada, contains the type specimens of five North American species of *Apanteles*, all described by Provancher, which the writer has had no opportunity of studying. These have been recognized and placed in the key on the basis of the original descriptions and notes made by A. B. Gahan, of the Bureau of Entomology, upon an examination of the type material several years ago.

The Connecticut Agricultural Experiment Station in New Haven is the depository for the types of five species, a study of which was made possible by the issuance of a special authorization by the Bureau of Entomology for the journey to New Haven. None of the type specimens of Say's four common species is now in existence, but an abundance of material in the National Collection placed in these species by Ashmead and Viereck has been carefully checked with the original descriptions and is regarded as valid. Types of six other species have not been studied—that of *nephopteris* Packard, the location of which is uncertain; of *ninigretorum* Viereck, which seems to have disappeared; of *carpatus* Provancher (not *carpatus* Say), which has been destroyed; of *americanus* Lepeletier, evidently deposited in an European collection; and of *glomeratus* Linnaeus and *melanoscelus* Ratzeburg, European species which have been introduced into this country. Since *nephopteris* Packard and *carpatus* Provancher are unrecognizable from the original descriptions they have not been included in the key to species; *ninigretorum* Viereck has been included, but not separated from *ensiger* Say; the writer's conception of *americanus* Lepeletier is based on the original description and on specimens in the National Collection so labeled by Ashmead. A large amount of valid material of *melanoscelus* Ratzeburg was studied at the Gipsy Moth Laboratory, in Melrose Highlands, Massachusetts, and many large series, both European and American, of *glomeratus* were available in the National Collection.

The writer desires to express his deep appreciation and sincere gratitude to A. B. Gahan, of the Bureau of Entomology, for much helpful advice in the course of the work, for his kindly and valuable criticism of the manuscript, and for aiding generally in every possible way in the preparation of this paper. Acknowledgment of indebtedness is also due Dr. W. E. Britton, of the Connecticut Agricultural Experiment Station, for the opportunity of examining the type material deposited at New Haven. For the loan of collections of *Apanteles* at their respective institutions the writer is indebted to Prof. G. A. Dean, of the Kansas Agricultural Experiment Station; Prof. S. A. Forbes, of the University of Illinois; Prof. Harrison Garman, of the Kentucky Agricultural Station; Dr. F. A. Fenton, of the Iowa Agricultural Experiment Station; and Prof. C. P. Gillette, of the Colorado Station.

## CLASSIFICATION.

## Superfamily ICHNEUMONOIDEA.

## Family BRACONIDAE.

## Subfamily MICROGASTERINAE.

## Genus APANTELES.

*Apanteles* FOERSTER, Verh. naturh. Ver. preuss. Rheinl., vol. 19, 1862, p. 245.

—VIERECK, Proc. Ent. Soc. Wash., vol. 11, 1909, p. 208

*Pseudapanteles* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 166.

*Protapanteles* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 166.

*Parapanteles* ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 131.

*Cryptapanteles* VIERECK, Proc. Ent. Soc. Wash., vol. 11, 1909, p. 209 (= *Apanteles* Ashmead, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 166, not Foerster).

*Urogaster* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 166 (= *Apanteles* Ashmead, not Foerster).

*Apanteles (Dolichogenidca)* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 173.

*Stenopleura* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 187.

Head usually transverse, rarely rostriform; occiput immargined; antennae slender, 18-segmented; eyes strongly hairy; thorax stout, broad; mesoscutum without parapsidal furrows, very rarely with the furrows evident posteriorly; propodeum usually more or less roughened, with or without a median longitudinal carina, sometimes incompletely areolated; anterior wing with the marginal cell open, only the first abscissa of the radius being present; second transverse cubitus entirely wanting, so that the second cubital cell is open behind; legs normal; abdomen sessile, varying in form from broad and depressed to very slender and strongly compressed; the two basal abdominal tergites usually more or less sculptured; ovipositor sheaths varying in length from subexserted to longer than the abdomen.

*Apanteles* belongs to the genuine Microgasterinae; it is, however, readily separated from *Microgaster* and *Microplitis*, its nearest allies, by the total absence of the second transverse cubital nervure in the fore wing.

Believing *Apanteles* in the broad sense to be one homogeneous group, and not susceptible of division into distinct smaller groups, as first suggested by Ashmead and later followed to some extent by Viereck, I have disregarded entirely the names proposed by Ashmead and Viereck, which are listed above in the synonymy; it has not even seemed advisable to retain them as subgenera because they merge so completely into one another.

Because of the large number of species in this genus, and because the differences between species are in many cases very slight and not well marked, and, further, because of the wide variation often found among individuals of the same species, the preparation of a workable key has been attended by serious difficulties. Without the aid of a large amount of biological data available, particularly at the

United States National Museum, it is doubtful whether this could have been accomplished at all. Information relative to the hosts and cocoons is valuable, and sometimes aids greatly in the absolute determination of a particular species. This information has especially helped the writer to determine the extent to which various structural characters could be relied upon for the separation of species.

In some sections of the genus color, especially color of the tegulae and of the legs, can be safely used to distinguish species; and color of the dorsum of the abdomen and of the antennae are sometimes sufficiently constant to be useful, but in other cases they are of no value. The wings supply but few good characters; however, the length of the first abscissa of the radius as compared with that of the transverse cubitus has been found valuable, as have also the color of the wings, the length of the metacarpus as compared with that of the stigma, and the direction of the nervellus. Leg characters, other than color, that have been employed are the length of the inner spur of the posterior tibiae as compared with that of the outer spur and with the metatarsus, and the sculpture on the outer face of the posterior coxae. The variation in the length of the female antennae has been found useful in a few instances, and the length of the ovipositor, varying from subexserted to longer than the abdomen, is often valuable in separating individuals of this sex. But the most important distinguishing characters are found in the sculpture of the propodeum, and in the shape and sculpture of the two basal abdominal tergites; many considerable differences occur which are quite constant; and yet even here the variation within species is often so great that other supporting characters must be employed. In all cases it is very desirable, when making determinations, to have before one a good series of specimens that individual variations may be noted and fully allowed for.

Probably all species of *Apanteles* are parasitic exclusively upon the larvae of Lepidoptera; at least there is no authentic record of a species of this genus having been bred from a larva of another order. Within themselves the species are by no means restricted to a single host, but almost invariably the hosts are very closely related, or at least there is a similarity of larval habit. *Apanteles congregatus* Say, for example, has been reared from a large number of hosts, none of these, however, being outside the family Sphingidae. *Apanteles xylinus* Say, *laeviceps* Ashmead, *griffini* Viereck, and *grenadensis* Ashmead are cutworm parasites, but apparently make no distinction between different species of cutworms; *Apanteles ornigis* Weed appears to infest leaf-miners only, but is not restricted to a particular species, attacking those forms which spend their entire larval life within a mine as well as those which are true

miners but a short time. Evidently all that is necessary in this last case is that the host larva should be a miner in the stage which the parasite prefers for oviposition. General similarity of appearance and close resemblance of habit apparently suffice to invite attack by a particular species of *Apanteles*.

Some species are solitary, while many others are gregarious, in the latter case sometimes as many as 100 or more individuals issuing from a single host. There seems, however, to be no correlation at all between this biological characteristic and any structural characters which might divide the genus into well-marked groups. The difference between the cocoons is often very striking. In color they vary through yellow and buff to dark brown and dark gray; and, in the case of the gregarious species, differ widely as to arrangement and the extent to which they are surrounded by loose silk.

As natural control agents of injurious insect pests many species of *Apanteles* assume an important rôle. Many of our most common injurious species are to a large extent held in check by parasites of this group. Among these may be mentioned *Pieris rapae* Linnaeus, the cabbage butterfly, also the gipsy and the brown-tail moths, and many cutworms, including the army worms. Because the genus contains species of widely diverse habits and biologies, the larvae of no considerable group of Lepidoptera are free from their attacks.

KEY TO THE SPECIES OF APANTELES.

1. Propodeum with a distinct areola, which is usually margined by strong carinae; if not sharply outlined, then the first abdominal tergite has a more or less distinct median longitudinal depression on the apical half, the second tergite is short, transverse and broader at apex than at base, and the ovipositor is at least half as long as the abdomen.....2.
- Propodeum without an areola, often with a median carina from base to apex.....52.
2. Abdomen very short and broad, and strongly depressed; the three basal abdominal tergites large, occupying practically all of the dorsum of the abdomen, and entirely rugose; propodeal areola very large and broad diamond-shaped, sharply margined; ovipositor sheaths subexserted.
  1. *bucculatricis*, new species.
- Abdomen never so short and broad and depressed, and never with the three basal abdominal tergites wholly rugose and occupying almost the entire dorsum of the abdomen.....3.
3. Face strongly rostriform, the malar space long; ovipositor sheaths as long as the abdomen.....4.
- Face normal.....6.
4. Posterior femora black.....2. *banksi* Viereck.
- Posterior femora dark testaceous.....5.
5. Propodeum and first abdominal tergite coarsely rugose, the propodeal areola defined by very strong ridges; second abdominal tergite uniformly roughened.....3. *crassicornis* (Provancher).
- Propodeum and first abdominal tergite not so coarsely roughened, the latter only finely rugulose on the apical half; second tergite almost entirely smooth and shining.....4. *dotichocephalus*, new species.

6. Ovipositor very short, hardly exerted; propodeum with a very large, almost quadrate areola, and with strong costulae arising at the base of the areola; apical lateral areas of the propodeum very large, perfectly smooth and highly polished within; legs pale testaceous, including the fore and middle coxae; a very small species.....5. *aletiae* Riley.
- Ovipositor at least nearly half as long as the abdomen; propodeum never with a quadrate areola, nbr with the costulae arising at the base of the areola; at least not combining all the characters noted above....7.
7. Thorax, abdomen and legs honey-yellow or reddish-testaceous.....8. Thorax always black; abdomen mostly or entirely black.....9.
8. Length 4 mm.; wings dark fuliginous.....6. *nigriceps* (Ashmead). Length 2.5 mm.; wings hyaline.....7. *imitator* (Ashmead).
9. Posterior polished area on the lateral face of the scutellum large, triangular in shape, and extending almost to the base of the scutellar disk; tegulae always yellowish or transparent-whitish.....10. Posterior polished area on the lateral face of the scutellum much smaller, usually semicircular in shape, and rarely extending half way toward base of scutellar disk along the side of the latter, the roughened striate area in front very large; tegulae variable in color.....21.
10. Second abdominal tergite uniformly roughened and opaque.....19. Second abdominal tergite smooth and shining, at most with a few punctures.....11.
11. All coxae and second and third abdominal tergites testaceous. 8. *cinctus* (Provancher). At least posterior coxae black; dorsum of the abdomen black.....12.
12. Nervellus straight, not curving at all toward base of wing; posterior femora black; propodeal areola rather circular.....9. *laericoxis*, new species. Nervellus distinctly curving behind toward base of wing.....13.
13. First abdominal tergite smooth and shining, with only a median longitudinal depression on the apical half, and much broader at apex than at base; posterior femora testaceous; malar space with a pale spot. 10. *disputabilis* (Ashmead). First abdominal tergite usually distinctly punctate or rugulose; otherwise not combining all the above characters.....14.
14. Posterior femora testaceous in both sexes; ovipositor sheaths longer than the abdomen; lateral membranous margins along the first and second abdominal tergites blackish.....11. *paranthrenidis*, new species. Posterior femora black or blackish in the male, and usually in the female; when dark testaceous in the female, then ovipositor sheaths are hardly as long as the abdomen, and the membranous margins along the apical half of the first abdominal tergite are testaceous.....15.
15. First abdominal tergite opaque, rugose; disk of scutellum very flat and wholly impunctate.....16. First abdominal tergite strongly shining, and only punctate or indistinctly roughened; disk of scutellum with some punctures along the sides....17.
16. First abdominal tergite very slender, parallel-sided...12. *epinotiae* Viereck. First abdominal tergite broad, trapezoidal....13. *balthazari* (Ashmead).
17. Ovipositor sheaths projecting hardly half the length of the abdomen; first abdominal tergite very slender, at least twice as long as broad at apex, and indistinctly punctate, the lateral membranous margins blackish. 14. *leucostigmus* (Ashmead). Ovipositor sheaths at least almost as long as the abdomen; otherwise not combining all the characters noted above.....18.

18. Ovipositor very strongly decurved at apex; lateral membranous margins along first abdominal tergite black; posterior femora deep black in both sexes.....15. *thurberiae*, new species.  
 Ovipositor but slightly decurved at apex; lateral membranous margins along the first abdominal tergite dark testaceous; posterior femora reddish-testaceous in female, blackish in male.....16. *megathymi* Riley.
19. Posterior femora black; wings white with clear stigma...17. *harti* Viereck.  
 Posterior femora mostly testaceous; wings hyaline with brown stigma...20.
20. Ovipositor sheaths half as long as the abdomen; nervellus curved behind toward base of wing; posterior femora and tibiae wholly testaceous.  
 18. *phthorimaeae*, new species.  
 Ovipositor sheaths as long as the abdomen; nervellus not curved; posterior femora blackish on apical third.....19. *acrobasisidis*, new species.
21. Posterior coxae entirely or mostly pale; abdomen often with more or less of the third and following tergites testaceous; sometimes the basal segments of antennal flagellum yellow.....22.  
 Posterior coxae black; abdomen black above; antennal flagellum unicolorous, black or brown.....25.
22. Second abdominal tergite roughened and dull; mesoscutum and disk of scutellum coarsely punctate and dull; basal segments of antennal flagellum yellow.....20. *ensiger* (Say); also 21. *niinigretorum* Viereck.  
 Second abdominal tergite smooth and polished.....23.
23. Disk of scutellum very flat, wholly impunctate and highly polished; third abdominal tergite more or less testaceous laterally; ovipositor sheaths about half as long as the abdomen.....22. *xanthopus* (Ashmead).  
 Disk of scutellum somewhat punctured.....24.
24. Abdomen entirely black above, dark fuscous beneath.  
 23. *leucopus* (Ashmead).  
 Abdomen with more or less reddish-yellow on the dorsal tergites; venter of abdomen largely pale.....24. *pinos* (Cresson).
25. Abdomen long and very slender, strongly compressed; first and second abdominal tergites finely ruguloso-striate; ovipositor sheaths exceedingly slender and a little longer than the abdomen; hind femora black, at least black along the upper and lower edges.....26.  
 Abdomen not so slender; otherwise not combining all the above characters.....27.
26. Propodeum finely rugulose and dull; the areola sharply margined; posterior femora entirely black.....25. *betheli* Viereck.  
 Propodeum punctate and shining; the areola not strongly circumscribed by carinae; posterior femora black only along the edges.....  
 26. *californicus*, new species.
27. Tegulae yellowish.....28.  
 Tegulae black.....43.
28. Propodeum with areola strongly margined by prominent carinae, and with distinct costulae; second abdominal tergite sometimes entirely smooth and highly polished.....29.  
 Propodeum without costulae; second abdominal tergite never smooth and highly polished.....39.
29. Second abdominal tergite entirely smooth and polished; hind femora always yellowish or testaceous.....30.  
 Second abdominal tergite rugulose, at least posteriorly; if practically entirely smooth and polished the hind femora are blackish.....36.





44. Mesoscutum and disk of scutellum closely deeply punctate or rugoso-punctate and dull; propodeum exceedingly coarsely rugose, with a large areola, which is margined by prominent carinae; first and second abdominal tergites roughened.....44. *trachynotus* Viereck.  
Never so coarsely roughened.....45.
45. Propodeum punctate, shining, and the areola merely represented by a depression without prominent margins.....46.  
Propodeum rugose, or at least with the areola sharply margined by carinae.....48.
46. Posterior tibiae deep reddish-testaceous, at most with the extreme apex dusky; apical margin of the second abdominal tergite practically straight.....45. *miantonomoi* Viereck.  
Posterior tibiae with at least the apical half black or fuscous, the base rather luteous; apical margin of the second abdominal tergite usually distinctly arcuated, especially in the female.....47.
47. Stigma narrow, without a pale spot at base; second abdominal tergite usually with striate roughening.....46. *melanopus* Viereck.  
Stigma broad, with a distinct pale spot at base; second abdominal tergite smooth and shining, rarely slightly punctate.....47. *cacoeciae* Riley.
48. Propodeal areola broad pentangular, margined by prominent carinae; costulae very prominent, marking off large, smooth, and shining, apical lateral areas.....48. *lacticolor* Viereck.  
Propodeal areola usually slender; costulae wanting.....49.
49. Second abdominal tergite entirely smooth and polished; disk of scutellum flat, wholly impunctate, very highly polished.....49. *diatraeae*, new species.  
Second abdominal tergite roughened and opaque.....50.
50. First abdominal tergite very broad at base, narrowing gradually from base to apex; both first and second abdominal tergites closely rugulose; wings hyaline, the stigma and veins very dark brown; ovipositor sheaths about half as long as the abdomen, and broad.....50. *laspeyresiae* Viereck.  
First abdominal tergite not distinctly narrowing from base to apex; wings rather whitish.....51.
51. Ovipositor sheaths hardly half as long as the abdomen; areola open at base.....51. *tischeriae* Viereck.  
Ovipositor sheaths at least two-thirds as long as the abdomen; areola completely circumscribed, closed at base by two oblique carinae converging anteriorly.....52. *aristoteliae* Viereck.
52. First abdominal tergite very long and broad, the sides parallel; the second and third tergites large and rectangular; first and second tergites coarsely rugoso-punctate and black; the third rugose, a crescent-shaped area at its base black; remainder of the abdomen largely reddish-testaceous; head, mesoscutum, and disk of scutellum very coarsely punctate; propodeum coarsely rugoso-punctate, with a strong median longitudinal carina, and with the posterior margin strongly curved, so that the apical angles project very prominently; stigma and veins of forewing fulvous; the radius arising almost three-fourths the way out on the stigma; ovipositor sheaths two-thirds as long as the abdomen.....53. *terminalis* (Gahan).  
Not combining all the above characters.....53.
53. First abdominal tergite large, base and apex of equal breadth; the second tergite short and broad, at least three to four times as broad as long; ovipositor sheaths two-thirds as long as the abdomen.....54.  
First and second abdominal tergites not as above.....57.
54. Posterior femora black.....54. *femur-nigrum* (Provancher).  
Posterior femora mostly pale.....55.

55. Propodeum smooth and polished; abdominal tergites mostly smooth-----  
55. *parallelis* (Ashmead).  
Propodeum and the two basal abdominal tergites coarsely rugose-----56.
56. Most of the thorax and the abdomen entirely red or reddish-testaceous-----  
56. *nigroviridatus*, new species.  
Thorax entirely and most of the abdomen black--57. *consimilis* (Viereck).
57. First abdominal tergite distinctly narrower at the apex than at the base;  
very rarely with the apex apparently as broad as base (*alaskensis* Ash-  
mead), and then the abdomen exceedingly slender and strongly com-  
pressed, with the second tergite very long-triangular-----58.  
First abdominal tergite never narrower, usually distinctly broader, at apex  
than at base-----95.
58. Face strongly rostriform, malar space long; ovipositor more than half as  
long as the abdomen-----59.  
Face normal-----60.
59. Propodeum wholly impunctate and highly polished; first and second ab-  
dominal tergites smooth and polished; ovipositor sheaths at least as  
long as the abdomen-----58. *cockerelli*, new species.  
Propodeum and the two basal abdominal tergites distinctly punctate;  
ovipositor sheaths hardly two-thirds as long as the abdomen-----  
59. *dakotae*, new species.
60. At least the face, the prosternum and mesosternum, and the entire venter  
of the abdomen honey-yellow-----61.  
Face and prosternum and mesosternum black-----62.
61. Entirely honey-yellow, except the head above and behind black; ovipositor  
sheaths almost as long as the abdomen; female antennae black, with a  
striking white annulus near the middle----60. *annulicornis* (Ashmead).  
Dorsum of thorax and abdomen dark brownish-black-----  
61. *brunneus* (Ashmead).
62. First and second abdominal tergites entirely smooth, impunctate and  
highly polished; first tergite very slender, strongly narrowed to the  
apex; the second triangular and very narrow at base; hind femora yel-  
lowish or yellowish-brown; ovipositor sheaths hardly visible-----88.  
First and second abdominal tergites at least somewhat roughened at the  
sides or posteriorly; rarely entirely smooth, and then not combining the  
above characters -----63.
63. Tegulae and hind femora testaceous or reddish-testaceous; wings very  
often more or less fuliginous or yellowish-----64.  
Tegulae dark brown or black; rarely transparent-whitish, and then the  
hind femora entirely black; wings usually hyaline; posterior coxae and  
the dorsum of the abdomen always black-----75.
64. Propodeum with a sharp median longitudinal carina from base to apex--65.  
Propodeum without a distinct median longitudinal carina from base to  
apex, at most with a broad shining median longitudinal elevation ex-  
tending to the base-----72.
65. Propodeum perfectly smooth, except for the strong median longitudinal  
carina, highly polished; ovipositor sheaths at least as long as the abdo-  
men; hind coxae black; wings hyaline-----62. *sesiae* Viereck.  
Propodeum more or less roughened, never polished; ovipositor sheaths not  
as long as the abdomen; hind coxae usually testaceous; wings more or  
less fuliginous or somewhat yellowish-----66.
66. Second abdominal tergite very short and broad, much more than twice as  
broad at apex as long-----67.  
Second abdominal tergite rather triangular, never twice as broad at apex  
as long; ovipositor sheaths never quite half as long as the abdomen--68.

67. All coxae testaceous.....63. *choreuti* Viereck.  
 Posterior coxae black.....64. *sancti-vincenti* Ashmead.
68. First abdominal tergite at apex and the second at base as broad as the  
 latter is long down the middle; ovipositor sheaths projecting at least one-  
 third the length of the abdomen.....69.  
 First abdominal tergite at apex and the second at base only about half as  
 broad as the latter is long down the middle; ovipositor sheaths scarcely  
 exerted .....70.
69. Dorsum of abdomen beyond the black first tergite mostly reddish or  
 reddish-testaceous; venter of abdomen entirely yellowish; ovipositor  
 sheaths honey-yellow to reddish.....65. *cinctiformis* (Viereck).  
 Dorsum of abdomen mostly blackish; venter of abdomen blackish at apex;  
 ovipositor sheaths blackish.....66. *papaipemae*, new species.
70. All coxae stramineous.....71.  
 Posterior coxae dark brown or black; radius of forewing a little  
 longer than transverse cubitus, and not uniting with it in a sharp  
 angle .....67. *luteipennis*, new species.
71. Wings hyaline.....68. *longicornis* (Provancher).  
 Wings somewhat yellowish; radius of forewing usually distinctly  
 shorter than transverse cubitus, and making a strong angle with  
 it .....69. *radiatus* Ashmead.
72. All coxae testaceous; first and second abdominal tergites mostly smooth  
 and shining, with only a few weak striulae and punctures at the sides;  
 propodeum indistinctly punctate.....70. *flavovariatus*, new species.  
 Posterior coxae dark brown or black.....73.
73. First abdominal tergite broader at apex than second is long, the latter  
 much broader at apex than long down the middle; ovipositor sheaths at  
 least half as long as the abdomen, strongly curved, sickle-like.  
 71. *neomexicanus*, new species.  
 First abdominal tergite narrower at apex than second is long; the second  
 hardly as broad at apex as long; ovipositor sheaths but very slightly  
 exerted, straight.....74.
74. Posterior femora entirely pale stramineous and somewhat compressed;  
 the third and following abdominal tergites usually castaneous; stigma  
 and veins of forewing very pale brown, the radius slender and longer  
 than the transverse cubitus.....72. *sarrothripae* Weed.  
 Posterior femora dark reddish-testaceous, usually edged with blackish;  
 abdominal tergites black; stigma and veins of forewing dark brown;  
 the radius no longer, usually shorter, than the transverse cubitus, and  
 joining the latter in a very strong angle.....73. *atticola* (Ashmead).
75. Posterior femora entirely, and the fore and middle femora mostly,  
 black.....76.  
 Posterior femora mostly, and the fore and middle femora entirely, yellowish  
 to dark testaceous.....83.
76. Stigma large; the metacarpus short, a little shorter than the stigma.....81.  
 Stigma moderate; the metacarpus at least a little longer than the  
 stigma.....77.
77. First and second abdominal tergites smooth and polished, or only indis-  
 tinctly punctate.....78.  
 First and second abdominal tergites rugulose.....79.
78. Propodeum with a prominent median longitudinal carina; ovipositor  
 sheaths half as long as the abdomen.....74. *ctiellae* (Viereck).  
 Propodeum without a median longitudinal carina, very smooth and shin-  
 ing; ovipositor sheaths not projecting.....75. *cassianus* Riley.

79. Wings somewhat infumated; ovipositor sheaths almost as long as the abdomen.....76. *victoriae*, new species.  
Wings perfectly hyaline, not at all clouded.....80.
80. First abdominal tergite smooth and polished on basal half; second tergite much broader at apex than long; radius of forewing longer than transverse cubitus and uniting with it in a sharp angle.  
77. *monticola* Ashmead.  
First abdominal tergite entirely minutely rugulose and opaque; second tergite no broader at apex than long.....78. *glacialis* (Ashmead).
81. Radius of forewing much shorter than transverse cubitus; ovipositor sheaths hardly exerted.....79. *feltiae* (Viereck).  
Radius of forewing at least as long as transverse cubitus; ovipositor sheaths almost as long as the abdomen.....82.
82. All legs entirely black; abdomen slender, compressed posteriorly.  
80. *niger*, new species.  
All tibiae mostly testaceous; abdomen broad, not compressed posteriorly.  
81. *scutellaris*, new species.
83. Parapsidal depressions distinct on the posterior two-thirds of mesoscutum; radius of forewing much shorter than transverse cubitus, and arising more than two-thirds of the way out on the stigma; first and second abdominal tergites coarsely rugose; wings slightly infumated.  
82. *thoracicus*, new name.  
Parapsidal depressions not distinct; otherwise not combining all the above characters.....84.
84. Second abdominal tergite much narrower at base and but little broader at apex than long; ovipositor sheaths subexserted.....85.  
Second abdominal tergite much broader at base than long, and at least twice as broad at apex as long; ovipositor sheaths very broad and at least two-thirds as long as the abdomen.....83. *stigmatophorae* Galan.
85. Fore and middle coxae and the extreme apex of hind coxae pale; the three basal segments of the female antennal flagellum yellowish.  
84. *compressus* Muesebeck.  
All coxae black; antennae entirely black.....86.
86. First abdominal tergite parallel-sided to near the apex, and then rounded off strongly.....87.  
First abdominal tergite narrowing gradually from base to apex.  
85. *compressiventris*, new species.
87. Posterior coxae with a conspicuous elongate-oval flattened area on outer face above; abdomen rather short, oval.....86. *phigaliae* Muesebeck.  
Posterior coxae evenly rounded at base; abdomen very slender, strongly compressed.....87. *alaskensis* (Ashmead).
88. Mesoscutums, disk of scutellum and propodeum wholly impunctate, perfectly smooth and highly polished.....88. *politus* Riley.  
Mesoscutum more or less punctate; propodeum rugulose or punctate, or with a median carina.....89.
89. All coxae entirely stramineous.....89. *militaris* (Walsh).  
At least posterior coxae black.....90.
90. Fore and middle coxae black.....92.  
Fore and middle coxae bright yellow.....91.
91. Propodeum finely rugulose.....90. *floridanus*, new species.  
Propodeum smooth and polished, but with a median longitudinal carina.  
91. *sordidus* Ashmead.

92. Tegulae stramineous.....93.  
Tegulae dark brown or black; antennae deep black and very long in both sexes.....92. *nigricornis*, new species.
93. Propodeum strongly punctate and opaque; a conspicuous, large, oblong-oval, flattened area on the outer face of hind coxae at base above, which is punctate within.....93. *websteri*, new species.  
Propodeum weakly punctate and shining; hind coxae without such large flattened area on outer face above.....94.
94. Disk of scutellum impunctate and very highly polished; radius of forewing a little longer than transverse cubitus.....94. *caffreyi*, new species.  
Disk of scutellum somewhat punctate, not polished; radius of forewing not longer than transverse cubitus.....95. *herbertii* Ashmead.
95. Abdomen very slender and exceedingly strongly compressed, at least as long as the thorax, and distinctly more than four times (usually much more) as long as broad in widest part; the two basal abdominal tergites striated; tegulae dark brown or black.....96.  
Abdomen not so long and slender and strongly compressed.....98.
96. Posterior femora black.....96. *gillettei* Baker.  
Posterior femora testaceous.....97.
97. Abdomen entirely black above, and deep fuscous to black on the sides and venter; wings clear hyaline.....97. *parastichtidis*, new species.  
Abdomen more or less testaceous on third and fourth dorsal segments; sides and venter almost entirely testaceous; wings slightly yellowish.  
98. *pholisorae* Riley.
98. Disk of scutellum large, convex, and closely coarsely punctate, or ruguloso-punctate and dull; first and second, and usually most of the third, abdominal tergites coarsely rugose; all coxae black or blackish; tegulae usually black, if yellowish, then with the first abdominal tergite very slender and parallel-sided.....99.  
Disk of scutellum not so coarsely rough and dull; at least not combining all the above characters.....103.
99. Tegulae yellow; first abdominal tergite very slender and parallel-sided.  
99. *junoniae* Riley.  
Tegulae black or blackish.....100.
100. Third abdominal tergite only weakly roughened at extreme base; hind femora always testaceous; second abdominal tergite usually distinctly shorter than the third.....100. *lunatus* (Packard).  
Third abdominal tergite mostly rugose, or the hind femora mostly black; second abdominal tergite distinctly as long as the third.....101.
101. Posterior femora largely pale; or, if mostly blackish, with the wings white.....102.  
Posterior femora black; wings hyaline.....101. *limenitidis* (Riley).
102. Hind femora stramineous; antennae brownish.....102. *agricola* (Viereck).  
Hind femora dark testaceous, with more or less blackish, at least on the apical third.....103. *nemoriae* Ashmead.
103. Antennae in both sexes dark brown or blackish, with the basal flagellar segments bright yellow; wings infumated; radius of forewing shorter than transverse cubitus, and making a sharp angle with it; tegulae, fore and middle coxae, and usually the hind coxae, yellowish to reddish-testaceous; spurs of posterior tibiae apparently equal in length, and not one-half as long as the metatarsus; second and third abdominal tergites almost always deep red in color.....104. *rufocoxalis* Riley.  
Not combining all the above characters.....104.

104. Posterior coxae dull and very coarsely punctate or granular on the outer face; spurs of the hind tibiae about equal in length and never longer than half the metatarsus, usually distinctly shorter; first and second abdominal tergites entirely, and sometimes the third in part, rugose, the first broadening gradually from base to apex, the second broad with the sides parallel; radius of forewing not longer than transverse cubitus ----- 105.  
 Posterior coxae not coarsely granular on outer face; or at least not the above combination of characters ----- 112.
105. Third abdominal tergite more or less roughened, at least somewhat granular, on the basal third or half; if practically smooth, as in some male specimens, then either the antennae are mostly bright yellow, or the hind femora are blackish; stigma normal, and distinctly shorter than the metacarpus ----- 106.  
 Third abdominal tergite smooth and polished; rarely, with fine striulae basally in the middle, and then the stigma abnormally large, a little longer than the metacarpus; male antennae always black; hind femora always pale ----- 108.
106. Fore and middle coxae yellow; tegulae yellowish or pale brown; usually more or less of the third and following abdominal tergites, and the entire venter of the abdomen, reddish-yellow ----- 105. *scitulus* Riley.  
 All coxae black; tegulae black; venter and sides of the abdomen at least black on the apical half ----- 107.
107. Posterior femora stramineous, with only the extreme apex dusky; male antennae largely yellow ----- 106. *xylinus* (Say).  
 Posterior femora black, or reddish-brown edged above with blackish; antennae of both sexes black ----- 107. *yakutatensis* Ashmead.
108. Tegulae and fore and middle coxae yellow; third abdominal tergite entirely bright yellow ----- 108. *crambi* Weed.  
 Tegulae blackish; third abdominal tergite at the most reddish-yellow laterally ----- 109.
109. Venter of the abdomen mostly black; disk of scutellum smooth, impunctate and highly polished ----- 111.  
 Venter of the abdomen mostly yellow or testaceous; scutellum with some shallow, but distinct, punctures; third and often the following tergites of the abdomen testaceous laterally ----- 110.
110. Stigma very large, very pale brown, transparent, a little longer than the metacarpus; hind femora and tibiae fuscous at extreme apex; posterior coxae closely punctate on outer face; third abdominal tergite often with some striulae basally in the middle ----- 109. *plathypenae*, new species.  
 Stigma moderate, a little shorter than the metacarpus; hind femora entirely pale testaceous, not at all fuscous at apex; posterior coxae coarsely granular on the outer face ----- 110. *autographae*, new species.
111. Abdomen short, broad-ovate; the posterior margin of the second abdominal tergite curving forward somewhat at the sides; basal segments of the antennal flagellum in the female pale ----- 111. *griffini* (Viereck) in part.  
 Abdomen more elongate; the posterior margin of the second abdominal tergite usually straight; antennae in both sexes wholly black.  
 112. *laeviceps* Ashmead.
112. First abdominal tergite with base and apex apparently of equal breadth, the sides parallel, or bulging somewhat; first and second tergites, and usually the third at base, rugose and dull; inner spur of hind tibiae not longer than half the metatarsus; ovipositor sheaths often projecting almost the length of the first abdominal tergite ----- 113.

- First abdominal tergite broadening gradually from base to apex; or, if apex is apparently no broader than base, then first and second tergites are largely smooth and shining, and the second subtriangular, being narrowed at base, or the inner spur of the posterior tibiae is distinctly longer than half the metatarsus; ovipositor sheaths never strongly projecting, usually subexserted.....120.
113. Entirely stramineous.....113. *robiniae* (Fitch).  
Mostly black.....114.
114. Propodeum without a median longitudinal carina, and partly smooth and shining; ovipositor sheaths strongly projecting, about as long as the first abdominal tergite; abdomen never strongly compressed; dorsal abdominal tergites always black.....115.  
Propodeum rugose, dull, usually with a distinct median longitudinal carina; ovipositor sheaths subexserted, or with the abdomen strongly compressed on the apical half; sometimes the third tergite testaceous laterally...117.
115. Inner spur of posterior tibiae distinctly longer than the outer; legs varying in color from entirely yellowish, including the coxae, to black; tegulae usually pale.....114. *ornigis* Weed.  
Inner spur of posterior tibiae not longer than outer; tegulae always black.....116.
116. Mesoscutum and disk of scutellum smooth and strongly shining; posterior femora mostly testaceous, at least in the female...115. *bedelliae* (Viereck).  
Mesoscutum and disk of scutellum opaque, the latter distinctly punctate; legs in both sexes deep black.....116. *rohweri*, new name.
117. Third abdominal tergite roughened on basal half in the middle.....118.  
Third abdominal tergite practically smooth.....119.
118. Abdomen short, broad; posterior coxae with a conspicuous flattened, shining area on outer face at base above; posterior tibiae blackish on apical two-thirds; apical margin of second abdominal tergite straight.  
117. *empretiae* (Viereck).  
Abdomen rather slender, strongly compressed posteriorly in the female; posterior coxae rather evenly rounded at base, without such flattened area; posterior tibiae dusky only at extreme apex; apical margin of the second tergite often curving forward at the sides.  
118. *diacrisiae* Gahan.
119. Posterior coxae black; posterior femora and tibiae entirely yellow; posterior margin of second abdominal tergite straight.  
119. *depressus* (Viereck).  
Posterior coxae usually yellowish on apical half; posterior femora always blackish on apical fourth above, also apex of posterior tibiae blackish; posterior margin of second abdominal tergite usually distinctly curving forward at the sides.....120. *pyralidis*, new species.
120. Second abdominal tergite subtriangular, much broader at apex than at base, hardly as broad at base as long; first tergite very slightly, or not at all, broader at apex than at base; both first and second tergites partly smooth and shining; inner spur of posterior tibiae very long, about two-thirds as long as the metatarsus.....121. *paleacritae* Riley.  
Second abdominal tergite very rarely subtriangular, and then with the inner spur of posterior tibiae not longer than half the metatarsus....121.
121. First abdominal tergite slender, no broader at apex than at base, the second very short, much broader at apex than at base, and defined laterally by sharp oblique grooves, mostly smooth and shining; hind femora largely blackish or fuscous; inner spur of posterior tibiae longer than the outer, and distinctly longer than half the metatarsus...122. *euchaetis* Ashmead.  
Not the above combination of characters.....122.

122. Tegulae yellow or testaceous; very rarely brown in the male, and then suturiform articulation is very broad and foveolate, the posterior margin of the second abdominal tergite distinctly curved posteriorly toward the sides, and the two basal tergites and the base of the third coarsely rugose; hind femora always testaceous.....148.  
Tegulae brown or black; posterior coxae always black; hind femora sometimes black.....123.
123. All femora entirely brownish-black; all tibiae entirely dark brown; second abdominal tergite almost entirely smooth and shining.  
123. *hallii* (Packard).  
At least the fore femora partly yellowish; tibiae mostly pale.....124.
124. Radius of forewing much shorter and stouter than the transverse cubitus, and making a strong angle with the latter, a distinct knob at the point of union; second abdominal tergite very smooth and shining; posterior coxae wholly impunctate and highly polished; posterior femora pale.  
124. *atalantae* (Packard).  
Radius of forewing not so short and stout; otherwise not combining all the above characters.....125.
125. Posterior femora variable in color, often black or blackish; if mostly yellowish, inner spur of posterior tibiae is longer than the outer and a little longer than half the metatarsus; first abdominal tergite always distinctly broader at apex than at base, the second never subtriangular or strongly narrowed at base.....126.  
Posterior femora always yellowish or testaceous; inner spur of posterior tibiae not, or indistinctly, as long as half the metatarsus, and often not longer than the outer spur; first abdominal tergite sometimes not broader at apex than at base, the second sometimes subtriangular.....141.
126. Stigma short and broad, the radius arising in the middle and perpendicular to the anterior margin of the wing; first and second abdominal tergites partly, the third and following entirely, smooth and shining; posterior femora black or blackish.....125. *theclae* Riley.  
Not the combination of characters noted above.....127.
127. Second abdominal tergite largely smooth and shining; hind femora always brownish-black or black in the male, sometimes in the female; when hind femora are yellowish (some female specimens) abdomen is compressed on apical half, and the antennae are as long as the body.  
126. *electrae* (Viereck).  
Second abdominal tergite usually entirely roughened; if mostly smooth, not combining the above characters.....128.
128. Posterior femora black or blackish; rarely testaceous in the female, and then the abdomen very suddenly and sharply compressed on the apical half, and the hypopygium projecting distinctly beyond the apex of the last dorsal segment.....129.  
Posterior femora mostly testaceous; abdomen never so strongly and suddenly compressed; hypopygium never projecting beyond apex of last dorsal segment of the abdomen.....134.
129. Third abdominal tergite more or less roughened on basal half; all coxae and trochanters, and the hind femora, black.....130.  
Third abdominal tergite entirely smooth and polished.....131.
130. Mesoscutum and disk of scutellum very shallowly and indistinctly punctate, strongly shining; radius of forewing perpendicular to anterior margin of wing, not tending outward, and with no knob at the point of union with the transverse cubitus.....127. *melanoscelus* (Ratzeburg).



- Mesoscutum and disk of scutellum distinctly punctate, the former usually opaque; radius of forewing somewhat oblique to anterior margin of wing, and tending outward; usually a small knob at the point of union of the radius and transverse cubitus.....128. *flaviconchae* Riley.
131. Inner spur of posterior tibiae longer than the outer and a little longer than half the metatarsus.....132.  
 Inner spur of posterior tibiae apparently not at all longer than the outer, and not quite half as long as the metatarsus.....133.
132. Mesopleura very coarsely punctate or granular anteriorly and along the lower edge; abdomen in female very sharply compressed on apical half.....129. *koebeleri* Riley.  
 Mesopleura entirely strongly shining, with only scattered punctures anteriorly; abdomen short and broad, not compressed.  
 130. *anisotae*, new species.
133. Stigma narrow; radius of forewing arising far out on stigma, so the inner side of the latter is almost twice as long as the outer side; disk of scutellum very small, perfectly smooth and very highly polished.  
 131. *nitens*, new species.  
 Stigma broader, the inner side but very slightly longer than the outer.  
 132. *carduicola* (Packard).
134. Sides and venter of the abdomen entirely dark testaceous, the dorsum more or less castaneous beyond the second tergite; radius of forewing not longer than the transverse cubitus.....133. *hesperidivorus* (Viereck).  
 Sides and venter of abdomen at least black on posterior half, and the dorsum entirely black; radius of forewing usually longer than transverse cubitus.....135.
135. First and second abdominal tergites entirely coarsely rugose, the third more or less roughened at base.....136.  
 Third abdominal tergite wholly smooth and polished.....138.
136. Abdomen very broad, almost half as broad as long; first abdominal tergite at least as broad at apex as long, and twice as broad at apex as second abdominal tergite is long; radius of forewing much longer than transverse cubitus.....134. *cyaniridis* Riley.  
 Abdomen not so broad; first tergite broadening but slightly toward apex, and only a little broader at apex than second tergite is long.....137.
137. Inner spur of posterior tibiae very stout and long, at least two-thirds as long as the metatarsus; venter of abdomen yellow on basal half; hind coxae closely punctate on outer face below.  
 135. *acaudus* (Provancher).  
 Inner spur of posterior tibiae not so long; venter of abdomen fuscous on basal half; posterior coxae mostly smooth and shining on outer face.....136. *argynnidis* Riley.
138. Mesoscutum very sparsely punctate, the punctures sharp and separate, confined to the anterior two-thirds of the mesoscutum, the posterior third being impunctate and highly polished; disk of scutellum perfectly flat, wholly impunctate and exceedingly highly polished; first abdominal tergite punctate, the second smooth and shining medially; hind coxae very smooth and polished; female antennae as long as the body.....137. *prcnidis*, new species.  
 Never so strongly shining, nor with mesoscutum and scutellum so highly polished; at least not combining all the above characters.....139.

139. Abdomen short, broad-ovate, almost half as broad on the third dorsal segment as long; hypopygium not quite attaining the apex of the abdomen; female antennae much shorter than the body.
138. *podunkorum* (Viereck).
- Abdomen not so short and broad, often somewhat compressed; the hypopygium attaining the apex of the last dorsal abdominal segment.....140.
140. Second abdominal tergite largely smooth and shining; female antennae very much shorter than the body.....139. *pyraustae* (Viereck).  
Second abdominal tergite entirely roughened; female antennae as long as the body.....140. *phobetri* (Rohwer).
141. Third abdominal tergite roughened on basal half.....141. *delicatus* Howard.  
Third abdominal tergite smooth.....142.
142. Posterior coxae somewhat granular above at base; disk of scutellum wholly impunctate and highly polished; first and second abdominal tergites entirely roughened.....147.  
Posterior coxae smooth and shining above; disk of scutellum at least indistinctly punctate; usually basal half of the first abdominal tergite and part of the second smooth and shining.....143.
143. Antennae yellowish beneath; stigma transparent; wing veins pale yellowish; length, 1.7 mm.....142. *algonquinorum* (Viereck).  
Antennae dark brown or black; stigma and veins brown; larger species.....144.
144. Wings slightly infumated, the veins and stigma dark brown; the subdiscoideus distinctly pigmented all the way to the margin of the wing; radius of the forewing oblique to the anterior margin of the wing, tending outward, and uniting with transverse cubitus in a very sharp angle; second abdominal tergite subtriangular, defined laterally on basal half by oblique grooves, and very narrow at base; a large, stout species.
143. *tmetocerae*, new species.
- Wings hyaline; veins and stigma not so dark brown; subdiscoideus not pigmented to the margin of the wing.....145.
145. First and second abdominal tergites entirely rugulose and dull; all coxae and trochanters black; radius of forewing about equal to the transverse cubitus.....144. *orobenae* Forbes.  
First and second abdominal tergites more or less smooth and shining, at least the first smooth and polished on basal half.....146.
146. Mesoscutum very shallowly, almost indistinctly, punctate; hind coxae with a very conspicuous, punctate, oval, flattened area on the outer face above.....145. *hydriae*, new species.  
Mesoscutum closely, distinctly punctate, the punctures confluent along the lines where the parapsidal furrows would be if present; hind coxae without such flattened area on outer face above.....146. *glomeratus* (Linnaeus).
147. Wings hyaline; abdomen elongate; suturiform articulation straight and very sharp; female antennae as long as the body, the flagellum not pale basally.....147. *acronyctae* Riley.  
Wings slightly infumated; abdomen short-ovate; posterior margin of second abdominal tergite usually distinctly curving forward at the sides; female antennae distinctly shorter than the body, the two basal flagellar segments pale.....111. *griffini* (Viereck), in part.
148. Abdomen entirely testaceous; propodeum and thoracic pleura more or less dark reddish to reddish-testaceous.....148. *pariventris* (Cresson).  
Abdomen at least partly black; thorax entirely black.....149.
149. Inner spur of posterior tibiae longer than the outer, and at least a little longer than half the metatarsus.....153.  
Inner spur of posterior tibiae not distinctly longer than the outer and not quite half as long as the metatarsus.....150.

150. Third abdominal tergite somewhat roughened at base; apical margin of second tergite curved posteriorly at the sides; suturiform articulation broad and foveolate.....151.  
 Third abdominal tergite smooth and shining; apical margin of second tergite not curved posteriorly at the sides.....152.
151. Radius perpendicular to the anterior margin of the wing, and much longer than the transverse cubitus; female antennae as long as the body.....149. *hyphantriae* Riley.  
 Radius oblique to the anterior margin of the wing, tending outward, and very slightly or not at all longer than the transverse cubitus; female antennae distinctly shorter than the body.....150. *clisiocampae* Ashmead.
152. First and second abdominal tergites rugulose; hind coxae mostly yellowish; tegulae dark testaceous.....151. *euphydryidis*, new species.  
 First and second abdominal tergites mostly smooth; hind coxae black; tegulae pale stramineous.....152. *smerinthi* Riley.
153. Third abdominal tergite somewhat roughened on the basal half or more.....154.  
 Third abdominal tergite smooth.....156.
154. Third tergite rugoso-striate on basal two-thirds, striations sometimes reaching the posterior margin of the tergite medially.....155.  
 Third tergite only punctate or weakly granular on the basal half.  
 153. *murtfeldtae* Ashmead.
155. Disk of scutellum rather dull and closely sharply punctate; venter of abdomen and apical half of posterior coxae usually testaceous; hind coxae rather granular.....154. *grenadensis* Ashmead.  
 Disk of scutellum shining, very weakly punctate; venter of abdomen mostly and hind coxae entirely black; hind coxae smooth.....155. *fiski* (Viereck).
156. Posterior coxae yellowish.....157.  
 Posterior coxae black.....158.
157. Antennae with the scape yellow and the flagellum pale beneath; dorsum of abdomen beyond third tergite mostly red.....156. *obseuricornis* (Viereck).  
 Antennae entirely fuscous; abdominal tergites usually black.  
 157. *marginiventris* (Cresson).
158. Third abdominal tergite more or less testaceous or reddish, at least reddish along entire lateral and apical margins; abdomen often entirely testaceous beyond second tergite; antennae usually pale; posterior coxae usually mostly testaceous.....159.  
 Third abdominal tergite wholly black; antennae and posterior coxae black.....162.
159. First abdominal tergite with the sides bulging strongly, the plate indistinctly broader at apex than at base; both first and second tergites closely rugulose.....158. *charadrae*, new species.  
 First abdominal tergite distinctly broader at apex than at base, the sides not bulging strongly.....160.
160. Abdomen short-ovate, depressed; second abdominal tergite entirely rugose; antennae pale; posterior coxae black.....159. *flavicornis* Riley.  
 Abdomen more elongate, and usually more or less compressed on apical half; the second tergite in large part smooth; posterior coxae usually testaceous on apical half.....161.
161. Abdomen slender, very strongly compressed on apical half; posterior coxae black; venter of abdomen mostly black.....160. *mayaguezensis* (Viereck).  
 Abdomen not so strongly compressed; venter of abdomen usually entirely testaceous; dorsum of abdomen beyond second tergite often reddish-testaceous; hind coxae usually pale at least at tip.  
 161. *americanus* (Lepeltier).

162. Posterior margin of the second abdominal tergite curved forward somewhat at the sides; if not distinctly so, then the tergite is smooth and polished.....162. *schizurae* Ashmead.  
 Posterior margin of second abdominal tergite straight; abdomen usually compressed on the apical half.....163.
163. Second abdominal tergite rugose; the third tergite usually with numerous hairpits; the third and following tergites giving off bluish reflections.....163. *congregatus* (Say).  
 Second abdominal tergite smooth and polished medially; the third and following tergites entirely smooth, without distinct hair-pits, deep black and very highly polished; abdomen in female strongly compressed.  
 164. *hemileuca* Riley.

#### DESCRIPTIONS OF SPECIES.

##### 1. *APANTELES BUCCULTRICIS*, new species.

Differs very markedly from all other species of this genus in that it possesses a very large areola on the propodeum, and at the same time has the three basal abdominal tergites entirely coarsely rugose and occupying almost the entire dorsum of the abdomen, while the ovipositor is subexserted.

*Female*.—Length, 1.8 mm. Face apparently narrowing somewhat below, shining, and with a rather distinct median longitudinal ridge; antennae at least as long as the body; vertex and temples weakly punctate and shining; mesoscutum with sharp punctures; disk of scutellum almost impunctate, polished; mesopleura largely polished; propodeum punctate and shining, with a very large and broad diamond shaped areola and prominent costulae; a short median longitudinal ridge leading from the base of the areola to the base of the propodeum; forewing with the stigma large, and the radius decidedly longer than the transverse cubitus; hind wing with the nervellus oblique but not curved toward base of wing; posterior coxae mostly smooth and shining; abdomen broad, depressed, the first tergite large, broader at apex than at base, and a little longer than broad at apex, more than a third as long as the abdomen; second tergite rectangular, a little longer than the third; the three basal abdominal tergites entirely coarsely uniformly rugose, and occupying practically all of the dorsum of the abdomen; the membranous margins on the apical third of the first tergite and along the second are so narrow as to be indistinct; ovipositor sheaths subexserted. Entirely black, including antennae, the tegulae, and the legs, except the base of all the tibiae, and the fore and middle tarsi, which are pale; wings slightly clouded, the veins and stigma black.

*Male*.—Essentially as in the female.

*Type locality*.—Palo Alto, California.

*Type*.—Cat. No. 22512, U.S.N.M.

*Host*.—*Bucculatrix* on *Quercus agrifolia*.

Described from one female and four male specimens bred by F. C. Herbert, in the Bureau of Entomology, under Hopkins, U. S. No. 15027Bb.

2. APANTELES BANKSI Viereck.

*Apanteles (Dolichogenidea) banksi* VIERECK, Proc. U. S. Nat. Mus., vol 40, 1911, p. 173.

*Habitat*.—Maryland.

*Host*.—Unknown.

The species is known only from the unique type in the United States National Museum.

3. APANTELES CRASSICORNIS (Provancher).

*Microgaster crassicornis* PROVANCHER, Addit. Faun. Canad. Hymenop., 1886, pp. 139, 142.

*Apanteles crassicornis* PROVANCHER, Addit. Faun. Canad. Hymenop., 1888, p. 388.

*Habitat*.—Canada, Maryland, Iowa, Michigan, Illinois.

*Host*.—Unknown.

The type of this species has not been seen by the writer, his conception of the species being based upon a specimen in the National collection determined by A. B. Gahan after an examination of the type. This specimen was collected at Agricultural College, Michigan. In addition, the National Collection contains a female specimen taken at Carlinville, Illinois, by Charles Robertson; also another female reared by H. L. Parker at Hagerstown, Maryland, September 10, 1916. The writer has also seen three female specimens, taken at Ames, Iowa, which are in the collection of the Iowa Agricultural Experiment Station.

4. APANTELES DOLICHOCEPHALUS, new species.

Very similar to *crassicornis*, from which it differs in having the propodeum and the two basal abdominal tergites much less coarsely rugose, also in having a large pale spot at the base of the stigma.

*Female*.—Length, 4.2 mm. Face much lengthened, rostriform, the malar space long; face and vertex of head very finely punctate, shining; mesoscutum with numerous exceedingly minute punctures; disk of scutellum flat, sparsely punctate; mesopleura mostly smooth and polished; propodeum rugoso-punctate, with a distinct roughly circular areola; apical angles projecting strongly posteriorly; forewing with the metacarpus longer than the stigma, and the radius much longer than the transverse cubitus; posterior coxae shining; inner spur of posterior tibiae not quite half the length of the metatarsus; abdomen large and stout, at least as long as the thorax; first tergite broad at base, narrowing somewhat toward apex, finely ruguloso-striate, and with an indistinct median longitudinal depression on apical half; second tergite transverse, very short, but longer medi-

ally than at the sides, the posterior margin decidedly arcuate, in large part smooth and shining, with only a few weak striulæ; remainder of the abdomen smooth and polished; ovipositor sheaths longer than the abdomen. Deep black in color; forewing with stigma dark brown, except for a large pale spot at base; all coxæ black; the remainder of the legs dark testaceous, except the extreme apex of the posterior tibiae and the posterior tarsi, which are fuscous; ovipositor sheaths black.

*Type locality*.—Falls Church, Virginia.

*Type*.—Cat. No. 22513, U.S.N.M.

Described from one specimen collected by Mr. Nathan Banks on September 19. Viereck's manuscript name has been adopted.

#### 5. APANTELES ALETIAE Riley.

*Apanteles aletiae* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 306.

*Habitat*.—Florida, Alabama.

*Host*.—*Alabama argillacea* Hübner (Riley).

*Cocoons*.—White; gregarious, but not imbedded in loose silk.

In addition to the type series the National collection contains a single specimen collected by E. A. Schwarz at Selma, Alabama.

#### 6. APANTELES NIGRICEPS (Ashmead).

*Urogaster nigriceps* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 284.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

Three cotypes in the United States National Museum have been studied; other cotypes are in the British Museum.

#### 7. APANTELES IMITATOR (Ashmead).

*Urogaster imitator* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 288.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

The unique type of this species is in the British Museum, and no specimens have been seen by the writer.

#### 8. APANTELES CINCTUS (Provancher).

*Microgaster cinctus* PROVANCHER, Natural. Canad., vol. 12, 1881, p. 196; Faun. Entom. Canad., Hymenop., 1883; Addit. Faun. Canad. Hymenop., 1886, p. 139.

*Apanteles cinctus* PROVANCHER, Addit. Faun. Canad. Hymenop., 1888, p. 388.

*Habitat*.—Canada.

*Host*.—Unknown.

Type in the Museum of Public Instruction at Quebec, Canada, and not examined. It has been given its position in the key on the basis of the original description and notes made by A. B. Gahan upon a study of the type specimen.

## 9. APANTELES LAEVICOXIS, new species.

*Female*.—Length, 2.7 mm. Face broader than long, punctate, opaque; a short, very narrow, median longitudinal groove on face just below the insertion of the antennae; vertex, temples, and cheeks closely punctate and dull; mesoscutum very closely, evenly punctate and opaque; scutellum with the disk large, slightly longer than broad at base, sparsely punctate and strongly shining; the polished area on the lateral face of scutellum large, reaching almost to the base of the disk; mesopleura punctate anteriorly, polished posteriorly, without a foveolate groove; propodeum coarsely punctate and dull on anterior half, and with a distinctly margined, rather circular, shining areola medially; the apical lateral areas strongly shining, the apical angles prominent; forewing with the radius apparently equal in length to the transverse cubitus, and uniting with the latter in an even curve without an angle at the point of union; posterior wing with the nervellus straight, not curving at all toward the base of wing, as in related species; posterior coxae smooth and polished, except for an elongate flattened area on the outer face above, which is punctate; inner spur of posterior tibiae much longer than the outer, and about as long as half the metatarsus; abdomen long; first tergite narrower at apex than at base, almost twice as long as broad at apex, smooth and polished, with a suggestion of a median longitudinal depression near the apex; second tergite transverse, very short, at least five times as broad at apex as long down the middle, apex straight, the entire tergite perfectly smooth and polished; the remainder of the abdomen smooth and polished; ovipositor sheaths slightly longer than the abdomen, the ovipositor curved at apex. Black; tegulae and wing-bases testaceous; wings hyaline, stigma brown, except for a pale spot at base, veins colorless; legs mostly black, including all coxae and trochanters, basal half of middle femora, and the posterior femora entirely; apical half of posterior tibiae and posterior tarsi dusky, ovipositor sheaths black.

*Type locality*.—Utica, Mississippi.

*Type*.—Cat. No. 22514, U.S.N.M.

Described from one specimen in the collection of the National Museum; Ashmead's manuscript name has been used.

## 10. APANTELES DISPUTABILIS (Ashmead).

*Urogaster disputabilis* ASHMEAD, TRANS. ENT. SOC. LONDON, 1900, pt. 2, p. 286.

*Habitat*.—St. Vincent; Grenada; Kansas; Texas.

*Host*.—Unknown.

Besides two cotypes of this species, the National collection contains a single specimen from Victoria, Texas, collected by W. E. Hinds, and another from Lawrence, Kansas, taken by Hugo Kahl.

## 11. APANTELES PARANTHRENIDIS, new species.

Closely allied to *megathymi*, from which it differs in the abdomen being very strongly compressed at apex, in the darker membranous margins along the two basal abdominal tergites, in the ovipositor being longer and more strongly curved at tip, and in the cocoons not being imbedded in a mass of silk.

*Female*.—Length, 3.8 mm. Face much broader than long, punctate, but somewhat shining; vertex, temples, and cheeks coarsely roughened and dull, strongly pilose; mesoscutum very closely punctate; disk of scutellum large, distinctly longer than broad at base, flat, practically impunctate and very shining; the polished area on the lateral face of scutellum extending anteriorly almost to the base of the disk; mesopleura punctate anteriorly, polished posteriorly, with a smooth longitudinal depression; propodeum rugoso-punctate, mostly opaque, with a large, sharply-defined areola, which is not clearly separated from a rather indistinct basal median area; costulae and lateral longitudinal carinae distinct; forewing with the metacarpus longer than the stigma; radius much longer than the transverse cubitus, and uniting with the latter in a very slight curve; nervellus distinctly curved toward base of wing; posterior coxae somewhat punctate above, shining; posterior femora stout; inner spur of posterior tibiae distinctly longer than the outer, and almost half as long as the metatarsus; abdomen about as long as the thorax, strongly compressed at apex; first tergite slightly broader at apex than at base, and at least one and one-half times as long as broad at apex, rugose, with a large roughened median longitudinal depression on the apical two-thirds; second tergite transverse, somewhat broader at apex than at base, and more than four times as broad at apex as long down the middle, smooth and polished, with only a few scattered punctures; remainder of abdomen smooth and shining; ovipositor prominently curved at tip, the sheaths longer than the abdomen. Black; tegulae transparent yellowish; wings hyaline, the stigma mostly colorless, with only the outline brown; all coxae black; basal trochanters blackish; remainder of legs testaceous; ovipositor sheaths black.

*Male*.—Posterior femora more or less blackish along the edges and at apex, also apex of posterior tibiae and most of posterior tarsi dusky; abdomen not so stout; otherwise essentially as in the female.

*Cocoons*.—Large, white, gregarious, but not imbedded in a mass of silk; they are formed in the burrows of the host.

*Type locality*.—Los Angeles County, California.

*Type*.—Cat. No. 22515, U.S.N.M.

*Host*.—*Paranthrene robiniae* Hy. Edwards.

Described from four female and four male specimens bred by A. Koebele, under Bureau of Entomology No. 132.



## 12. APANTELES EPINOTIAE Viereck.

*Apanteles (Apanteles) epinotiae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 614.

*Habitat.*—New Jersey.

*Host.*—*Enarmonia saliciana* Clemens (Viereck).

Known only from the type series in the United States National Museum.

## 13. APANTELES BALTHAZARI (Ashmead).

*Crogaster balthazari* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 284.

*Habitat.*—Grenada.

*Host.*—Unknown.

This species, the type of which is in the British Museum, is known to the writer only through the original description. Apparently it can be separated from *epinotiae* only by the broader trapezoidal first abdominal tergite.

## 14. APANTELES LEUCOSTIGMUS (Ashmead).

*Crogaster leucostigmus* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 289.

*Habitat.*—St. Vincent; Grenada.

*Host.*—Unknown.

The National Collection contains several cotypes of this species; other cotypes are in the British Museum.

## 15. APANTELES THURBERIAE, new species.

Closely resembles *megathymi*, from which it differs in the posterior femora being deep black in both sexes, in the black membranous margins along the first abdominal tergite, and in the strongly de-curved ovipositor.

*Female.*—Length, 3.8 mm. Face much broader than long, uniformly shallowly punctate, and with a rather distinct median ridge just below insertion of the antennae; mesoscutum evenly and very closely punctate; disk of scutellum large, flat, and distinctly longer than broad at base, almost impunctate, polished; mesopleura evenly punctate anteriorly, polished posteriorly; propodeum rugose, with a large, sharply-defined areola crossed within by a number of strong transverse rugae, costulae usually present, apical angles prominent; posterior coxae smooth, with only a few punctures at base; posterior femora stout; inner spur of posterior tibiae distinctly longer than the outer and about half the length of the metatarsus; abdomen about as long as the thorax, broad and not compressed toward apex; first tergite broader at apex than at base, and distinctly less than one and one-half times as long as broad at apex, rugoso-punctate, with a large median longitudinal fovea on the apical two-

thirds; second tergite short, transverse, longer medially than at the sides, the apical margin being strongly arcuate, at least four times as broad at apex as long down the middle, slightly broader at apex than at base, smooth and shining, like the remainder of the abdomen; hypopygium not extending beyond the apex of the last dorsal abdominal segment; ovipositor strongly decurved at tip, the sheaths about as long as the abdomen. Black; antennae entirely black; tegulae transparent-whitish; wings whitish-hyaline, stigma and veins colorless, only the outline of the stigma being brown; all coxae and trochanters, basal half of the middle femora and the hind femora entirely, black; apex of the posterior tibiae and the posterior tarsi mostly blackish; remainder of the legs reddish-testaceous; ovipositor sheaths black.

*Male*.—Abdomen more slender, and the first tergite not distinctly broader at apex than at base; otherwise essentially as in the female.

*Cocoons*.—White, solitary, and formed in the bolls.

*Type locality*.—Stone Cabin Canyon, Santa Rita Mountains, Arizona.

*Allotype locality*.—Sabino Canyon, Arizona.

*Type*.—Cat. No. 22516, U.S.N.M.

*Host*.—Bollworm on *Thurberia thespesioides*.

Described from 18 female and 12 male specimens bred by W. D. Pierce (one specimen, bred Aug. 15, 1913); A. W. Morrill (two specimens, bred Nov. 15, 1913); and C. H. T. Townsend (the remainder of the specimens, bred during late August and early September, in 1917 and 1918).

#### 16. APANTELES MEGATHYMI Riley.

*Apanteles megathymi* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 304; in Scudder, Butterflies U. S., 1889, p. 1903.

*Habitat*.—South Carolina.

*Host*.—*Megathymus yuccae* Boisduval and LeConte (Riley).

Known only from the large series of cotypes in the National Collection. The species is very close to *thurberiae*, from which it can be separated by the characters noted in the key; furthermore *megathymi* is gregarious, the cocoons being packed close together in the burrow of its host, while *thurberiae* is solitary.

#### 17. APANTELES HARTI Viereck.

*Apanteles harti* VIERECK, Proc. Ent. Soc. Wash., vol. 11, 1910, p. 209.

*Habitat*.—District of Columbia.

*Host*.—*Pyrausta penitalis* Grote (Viereck).

*Cocoons*.—White, solitary.

Known only from the type series in the United States National Museum.

## 18. APANTELES PHTHORIMAEAE, new species.

*Female*.—Length, 2.1 mm. Face smooth and shining, only indistinctly punctate, decidedly broader at the insertion of the antennae than at the base of the clypeus; clypeus distinctly separated from the face; vertex of head very smooth and shining; mesoscutum evenly punctate, shining; disk of the scutellum very flat, practically impunctate and highly polished; the broad suture at the base of the disk with only six or seven pits; mesopleura smooth and polished except anteriorly, where they are slightly punctate; propodeum areolated, the carinae very prominent, and the areas between them very smooth and shining; the sharply margined areola short-pentangular, with a strong ridge extending from its base to the base of the propodeum; radius about as long as the transverse cubitus, and making a sharp angle with the latter at the point of union; hind coxae smooth and polished, impunctate; inner spur of posterior tibiae distinctly longer than the outer, but not quite half as long as the metatarsus; abdomen almost as long as the thorax, and broad; first and second abdominal tergites ruguloso striate, the second more finely so; first tergite narrowing slightly toward apex, twice as long as broad at apex, and possessing a long, very slender, median longitudinal depression on the apical half; second tergite short, transverse, much broader at apex than at base and four or five times as broad at apex as long down the middle, the posterior margin straight, or at least not arcuate; lateral membranous margins along the two basal abdominal tergites broad; the dorsal abdominal segments beyond the second smooth and polished; ovipositor sheaths half the length of the abdomen. Black; scape of the antennae mostly reddish-testaceous; tegulae and wing-bases, also the legs, except the posterior coxae, which are black on the basal two-thirds, testaceous; ovipositor sheaths black.

*Type locality*.—Baton Rouge, Louisiana.

*Type*.—Cat. No. 22517, U.S.N.M.

*Host*.—*Phthorimaea glochinella* Zeller.

One female specimen bred by J. L. E. Lauderdal, November 1, 1916, and recorded in the Bureau of Entomology under Chittenden No. 4269-1.

## 19. APANTELES ACROBASIDIS, new species.

Closely allied to *phthorimaeae*, from which it differs in its larger size, in the broader first abdominal tergite, which is not narrowed posteriorly, in the darker posterior legs, and in the longer ovipositor.

*Female*.—Length, 2.8 mm. Face much broader than long, about as broad at base of clypeus as at insertion of antennae, very minutely shallowly punctate and shining; clypeus distinctly separated from face; vertex weakly punctate, rather opaque, mesoscutum shining, evenly, shallowly punctate; disk of scutellum large, flat, truncate at apex, smooth and polished, impunctate; mesopleura mostly polished;

propodeum with a very sharply margined short and broad areola, also with strongly elevated costulae and lateral longitudinal carinae, the areas between the ridges weakly punctate and strongly shining; radius of forewing only slightly longer than transverse cubitus and uniting with it in an even curve; posterior coxae smooth and shining; inner spur of posterior tibiae longer than the outer, but not half as long as the metatarsus; abdomen almost as long as the thorax, and very broad; first tergite large, parallel-sided, or very slightly broader at apex than at base, a little longer than broad, and coarsely rugose, with a large shining median longitudinal fovea on the apical half; second tergite short and broad, more than four times as broad at apex as long down the middle, and longer medially than at the sides, the posterior margin being arcuate, this tergite very feebly rugulose; suturiform articulation broad and foveolate; remainder of the abdomen very smooth and shining; ovipositor sheaths about as long as the abdomen. Black; scape yellowish; wings hyaline, the veins brown; legs, except all coxae, which are black, and the apical third of the posterior femora, apical half of posterior tibiae, and the posterior tarsi, which are blackish, testaceous; venter of the abdomen black; ovipositor sheaths black.

*Type locality*.—College Park, Maryland.

*Type*.—Cat. No. 22518, U.S.N.M.

*Host*.—(?) *Acrobasis caryae* Grote, on English walnut.

One female specimen reared by A. B. Gahan, August 17, 1912.

#### 20. APANTELES ENSIGER (Say).

*Microgaster ensiger* SAY, Boston Journ. Nat. Hist., vol. 1, pt. 3, 1836, p. 260;  
LeConte, Writ. of Th. Say, Entom., vol. 2, 1859, p. 711.

*Apanteles nipmuckorum* VIERECK, Bull. 22, Conn. State Geol. and Nat.  
Hist. Surv., 1916, pp. 191, 200.

*Habitat*.—Indiana; Illinois; Connecticut; New York; District of Columbia; New Hampshire; Canada.

*Host*.—(?) *Crambus zeellus* Fernald.

The type of this species has been lost, but there is probably no doubt as to the identity of the species. A female specimen in the United States National Museum, bearing Ashmead's label, upon which there is a neotype notation by Viereck, has been considered typical by the writer. There can be no question that *nipmuckorum* Viereck is *ensiger* Say.

The National Collection contains specimens from the following localities: Long Island and Oswego, New York; Ottawa, Canada; Washington, District of Columbia; Algonquin, Illinois; and Mount Washington, New Hampshire. One specimen bears the number 3679° and is labeled as having been reared from *Crambus zeellus* Fernald, June 22, 1888.

## 21. APANTELES NINIGRETORUM Viereck.

*Apanteles (Apanteles) ninigretorum* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 191, 200.

*Habitat*.—Connecticut.

*Host*.—Unknown.

Type apparently lost. There is nothing in the original characterization which will separate this species from *ensiger*.

## 22. APANTELES XANTHOPUS (Ashmead).

*Urogaster xanthopus* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 288.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

Known only from the cotype material in the National Collection; other cotypes are in the British Museum. It is closely allied to *ensiger*, from which it can be readily separated by the smooth and polished second abdominal tergite.

## 23. APANTELES LEUCOPUS (Ashmead).

*Urogaster leucopus* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 287.

*Habitat*.—St. Vincent; Grenada.

*Host*.—Unknown.

Only the single cotype specimen in the National Museum has been seen by the writer; other cotypes are in the British Museum. The species is readily distinguished from *xanthopus* and *pinos* by the black abdomen.

## 24. APANTELES PINOS (Cresson).

*Microgaster pinos* CRESSON, Proc. Ent. Soc. Philad., vol. 4, 1865, p. 67.

*Habitat*.—Isle of Pines, West Indies.

*Host*.—Unknown.

Placed in the key on the basis of the original description. The type, which is in the Academy of Sciences at Philadelphia, has not been seen.

## 25. APANTELES BETHELI Viereck.

*Apanteles (Apanteles) betheli* VIERECK, Proc. U. S. Nat. Mus., vol. 39, 1910, p. 402.

*Habitat*.—Colorado.

*Host*.—(?) *Argyresthia*, species on oak (Viereck).

Known only from the three specimens constituting the type series in the National Collection.

## 26. APANTELES CALIFORNICUS, new species.

Very similar to *betheli*, from which it is distinguished by the more smooth and shining propodeum, by the areola not being sharply circumscribed, and by the lighter legs.

*Female*.—Length, 2.8 mm. Face narrowing below so that it is narrower at base of clypeus than at the insertion of the antennae, no broader than long, and somewhat punctate and opaque; vertex, temples, and cheeks likewise weakly punctate and opaque; mesoscutum finely uniformly punctate and dull; disk of scutellum longer than broad at base, flat, and smooth, with only a few indistinct punctures at the sides, and rather shining; suture at base of scutellar disk so narrow that the numerous pits within can scarcely be distinguished; the smooth and polished area on the lateral face of scutellum not extending anteriorly halfway to the base of the disk; mesopleura smooth and very highly polished; propodeum somewhat punctate and shining, but with a shallow areola, which is not sharply margined: apical angles of propodeum projecting strongly; radius of forewing much longer than transverse cubitus; posterior coxae somewhat punctate, rather shining, a distinct oval flattened or sunken area at base above; spurs of posterior tibiae equal in length and not half as long as the metatarsus; abdomen very slender, as long as the thorax, almost four times as long as its extreme breadth; first tergite parallel-sided, very slender, at least twice as long as broad at apex, very finely ruguloso-striate, with a slightly depressed, shining, median longitudinal area on apical half; second tergite transverse, more than three times as broad as long down the middle, and longer medially than at the sides, the posterior margin being decidedly curved, broader at apex than at base, and very finely ruguloso-striate, like the first tergite; remainder of the abdomen smooth and shining; hypopygium sword-like, very slender and strongly projecting; ovipositor sheaths slender and longer than the abdomen. Black; antennae entirely black; tegulae, all coxae, posterior trochanters, both edges of posterior femora, apical third of posterior tibiae, and all of the posterior tarsi, also ovipositor sheaths, and the venter of the abdomen, black or blackish.

*Male*.—Essentially as in the female, except that the second abdominal tergite is relatively longer and not so broad.

*Type locality*.—Yosemite National Park, California.

*Type*.—Cat. No. 22520, U.S.N.M.

*Host*.—*Recurvaria milleri* Busck.

Described from 11 female and 1 male specimens bred July 31, 1917, by J. E. Patterson and recorded in the Bureau of Entomology under Hopkins U. S. No. 13322<sup>b</sup>.

27. APANTELES PSEUDOGLOSSAE, new species.

*Female*.—Length, 2.7 mm. Face much broader than long, punctate, shining; clypeus distinctly separated from face; a conspicuous short median ridge on face just below insertion of antennae; vertex and temples closely punctate, dullish; disk of scutellum slightly

convex, about as long as broad at base, almost impunctate, and strongly shining; the posterior polished area on lateral face of scutellum extending forward to about the middle of the disk; mesopleura shining, punctate below and anteriorly; propodeum rugose, with a large, sharply margined, somewhat diamond-shaped areola that is shining within; costulae distinct; apical angles of propodeum prominent; forewing with radius much longer than transverse cubitus; nervellus strongly curved toward base of wing behind; posterior coxae somewhat punctate, shining; inner spur of posterior tibiae much longer than the outer and about half the length of the metatarsus; abdomen hardly as long as the thorax, rather broad beyond the first segment; first tergite long, slender, about as broad at apex as at base, the sides slightly rounded, more than twice as long as broad at apex, rugose, and with a large median longitudinal shining fovea on apical half; second tergite transverse, the sides oblique, so that the plate is broader at apex than at base, longer medially than at the sides, the posterior margin being arcuate, about four times as broad at apex as long down the middle, and perfectly smooth and shining, like the remainder of the abdomen; lateral membranous margins along the apical half of the first tergite and along the entire length of the second, very broad; ovipositor sheaths slightly less than half the length of the abdomen. Black; antennae entirely black; tegulae testaceous; wings hyaline, the stigma and veins uniformly pale brown; legs testaceous, except all coxae, which are black, and the apex of the posterior tibiae and the posterior tarsi, which are dusky; ovipositor sheaths black.

*Male*.—Abdomen more slender than in the female, the basal abdominal tergite a little narrower at apex than at base, and the second tergite about as broad at base as long down the middle.

*Type locality*.—Rockville, Maryland.

*Type*.—Cat. No. 22519, U.S.N.M.

*Host*.—*Epizeuxis lubricalis* Geyer.

Three female and four male specimens bred under Bureau of Entomology No. 2667. Ashmead's manuscript name has been adopted.

#### 28. APANTELES HYALINUS (Cresson).

*Microgaster hyalinus* CRESSON, Proc. Ent. Soc. Philad., vol. 4, 1865, p. 68.

*Urogaster hyalinus* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 283.

*Habitat*.—Cuba.

*Host*.—Unknown.

No specimen of this species, the type of which is in the Academy of Sciences at Philadelphia, has been seen by the writer. It seems that there can be no doubt that Ashmead had Cresson's species in mind when he included *hyalinus* in a key to the West Indian species of *Urogaster*.

## 29. APANTELES VULGARIS (Ashmead).

*Urogaster vulgaris* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 286.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

Represented in the National Collection by four cotype specimens; other cotypes are in the British Museum.

## 30. APANTELES INSULARIS, new name.

*Urogaster grenadensis* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 285  
(not *Apanteles grenadensis* Ashmead, same reference, p. 277).

*Habitat*.—St. Vincent; Grenada.

*Host*.—Unknown.

The National Collection contains a single cotype specimen of this species.

The name *grenadensis* is preoccupied by *Apanteles grenadensis* Ashmead.

## 31. APANTELES RHOMBOIDALIS (Ashmead).

*Urogaster rhomboidalis* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2,  
p. 290.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

There are three cotype specimens of this species in the National Museum; these have furnished the characters used in the key. Other cotypes are in the British Museum.

## 32. APANTELES MERIDIONALIS (Ashmead).

*Urogaster meridionalis* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2,  
p. 285.

*Habitat*.—St. Vincent; Grenada.

*Host*.—Unknown.

Known to the writer only from the single cotype in the National Collection. The British Museum collection contains another cotype.

## 33. APANTELES CONANCHETORUM Viereck.

*Apanteles (Apanteles) conanchetorum* VIIEECK, Bull. 22, Conn. State Geol.  
and Nat. Hist. Survey, 1916, pp. 191, 199.

*Habitat*.—Connecticut.

*Host*.—Unknown.

Known only from the type which is in the collection of the Connecticut Agricultural Experiment Station, at New Haven, Connecticut.



## 34. APANTELES PICEOVENTRIS, new name.

*Urogaster solitarius* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 287  
(not *solitarius* Ratzeburg, Ichn. Forstins., vol. 3, 1844, p. 25.)

*Habitat.*—Grenada.

*Host.*—Unknown.

The writer has seen no representative of this species the type of which is in the British Museum. It is placed in the key solely upon the characters given in the original description.

## 35. APANTELES ACICULATUS (Ashmead).

*Urogaster aciculatus* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 289.

*Habitat.*—Grenada.

*Host.*—Unknown.

The type of this species is in the British Museum and has not been examined. The species has been given its place in the key on the basis of the original description.

## 36. APANTELES CARPATUS (Say).

*Microgaster carpata* SAY, Boston Journ. Nat. Hist., vol. 1, pt. 3, 1836, p. 263;  
LeConte, Writ. of Th. Say, Entom., vol. 2, 1859, p. 714.

*Apanteles carpatus* Say, CHITTENDEN, U. S. Div. Ent. Bull. 8, new. ser.,  
1897, p. 42.

*Apanteles ensiger* Say=(*Microgaster carpatus* Say) DALLA TORRE, Cata-  
logus Hymenopterorum, vol. 4, 1898, p. 169.

*Apanteles (Apanteles) carpatus* Say, VIERECK, Bull. 22, Conn. State Geol.  
and Nat. Hist. Survey, 1916, pp. 191, 200.

*Habitat.*—Widely distributed over at least the eastern half of the  
United States.

*Hosts.*—*Tinea pellionella* Linnaeus; *Trichophaga tapetiella* Lin-  
naeus.

The type of this species has been lost. The writer's conception of the species is based upon specimens in the National Collection determined by Ashmead, and which appear to agree in every respect with the original description. There are in the United States National Museum numerous representatives of the species, for the most part consisting of collected material, but including also the following: A series bearing Bureau of Entomology No. 3638<sup>-01</sup>, reared from *Tinea pellionella*; two specimens reared by W. D. Kearfott from the same host; and a series from *Trichophaga tapetiella*, bearing the number 240<sup>x</sup>, without further data.

## 37. APANTELES FORBESI Viereck.

*Apanteles (Apanteles) forbesi* VIERECK, Proc. Ent. Soc. Wash., vol. 11, 1910, p. 208.

*Habitat*.—Illinois; Indiana; Iowa; Kansas; Maryland; Connecticut; New York; Massachusetts; Kentucky; Oregon; apparently very widely distributed.

*Hosts*.—*Cirphis unipuncta* Haworth; *Polia renigera* Stephens; *P. stricta* Walker; *Feltia* sp.; "cutworms."

*Cocoons*.—White; solitary.

The National Collection contains besides the type series the following material: Two specimens from Hagerstown, Maryland, reared from *Feltia*, species by W. E. Pennington; one specimen from the same locality, reared by Mr. Pennington, from *Polia renigera* Stephens; four specimens from Forest Grove, Oregon, reared by L. P. Rockwood from *Polia stricta* Walker, under Webster No. 18460; one specimen from Linton, Indiana, reared from cutworm by S. L. Mason, Lafayette Cage No. E105e; one specimen from Buck Creek, Indiana, J. J. Davis, collector, cage No. D200be; one specimen from Lafayette, Indiana, J. J. Davis, collector, cage No. D195bg. In addition, the writer has seen one specimen in the Cornell University collection, taken at Ithaca, New York; also one specimen reared from the army worm by H. Garman, at Lexington, Kentucky, in the collection of the Kentucky Agricultural Experiment Station; and several specimens in the collections of the Agricultural Experiment Stations of Iowa and Kansas.

## 38. APANTELES EPHESTIAE Baker.

*Apanteles ephestiae* BAKER, Ent. News, vol. 6, 1895, p. 201.

*Habitat*.—Colorado.

*Host*.—*Ephestia kuehniella* Zeller (Baker).

Represented in the National Collection by five cotype specimens. The species structurally and biologically resembles *carpatius* Say, from which it differs only in the wings being hyaline rather than whitish, in the veins of the forewing being brown, and in the stigma being longer and not so broad, also in the darker posterior femora.

## 39. APANTELES EDWARDSII Riley.

*Apanteles edwardsii* RILEY, Scudder, Butterflies U. S., 1889, p. 1901.

*Apanteles ensiger* Say=(*Apanteles edwardsii* Riley) DALLA TORRE, Catalogus Hymenopterorum, vol. 4, 1898, p. 169.

*Apanteles (Apanteles) edwardsii* Riley, VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 190, 199.

*Habitat*.—Connecticut.

*Host*.—*Vanessa atalanta* Linnaeus (Riley).

*Cocoons*.—White; solitary.

Known only from the type series in the National Collection.

## 40. APANTELES PLESIUS Viereck.

*Apanteles (Apanteles) plesius* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 615.

*Habitat*.—New Jersey.

*Host*.—"Larva on white oak" (Viereck).

Known only from the unique type in the United States National Museum; the abdomen of this specimen is missing.

## 41. APANTELES POLYCHROSIDIS Viereck.

*Apanteles (Apanteles) polychrosidis* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 615.

(*Apanteles polychrosidis* Viereck) = *Apanteles fumiferanae* Viereck, GAHAN, Proc. U. S. Nat. Mus., vol. 55, 1919, p. 121.

(?) (*Microgaster*) *Apanteles clavatus* PROVANCHER, Natural. Canad., vol. 12, 1881, p. 196.

*Habitat*.—District of Columbia; Pennsylvania; New York; ?Canada.

*Hosts*.—*Polychrosis lirioidendrana* Kearfott; *P. viteana* Clemens; *Gracilaria*, species.; *Cacoecia rosaceana* Harris.

*Cocoons*.—White; solitary.

Besides the type series the National Collection contains the following representatives of this species: Six specimens reared by R. A. Cushman from the grape berry moth at North East, Pennsylvania, under Quaintance No. 11081; two specimens from the same host, *Polychrosis viteana*, and the same locality, under Quaintance No. 10907; one specimen reared by D. Isely from a leaf-miner on *Prunus serotina*, at North East, Pennsylvania, under Quaintance No. 10961; one specimen, without locality label, reared from *Cacoecia rosaceana* under Bureau of Entomology No. 46°; several specimens reared by C. R. Ely at Washington, District of Columbia, from *Gracilaria*, species. In addition, the writer has seen a number of specimens in the Cornell University collection, which were collected at Ithaca and McLean, New York.

In the opinion of the writer, *polychrosidis* is distinct from *fumiferanae*, being distinguished from that species by the yellow tegulae, by the smoother and more polished disk of scutellum, by the indistinctly punctate mesoscutum, and by the usually darker legs. Apparently it is identical with *clavatus* Provancher, agreeing with Provancher's description, also with notes on *clavatus* made by A. B. Gahan after an examination of the type, which remains in the Provancher collection at Quebec. However, since the type specimen is badly broken and in generally poor condition, the synonymy is queried. Should *polychrosidis* and *clavatus* prove to be identical, *clavatus* would be the valid name.

42. *APANTELES CANARSAE* Ashmead.

*Apanteles canarsiae* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 127.

*Apanteles (Apanteles) housatannuckorum* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 189, 198.

*Apanteles (Apanteles) maquinai* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 190, 199.

*Habitat.*—Illinois; Virginia; District of Columbia; Connecticut; Iowa.

*Hosts.*—*Psorosina hammondi* Riley (Ashmead); *Desmia funeralis* Hübner.

*Cocoons.*—White; solitary.

The type material of *canarsiae* has been carefully compared with that of the two species listed in the synonymy; and the writer is of the opinion that the three names have been applied to the same species.

In addition to the type series of *canarsiae* there are in the National collection the following representatives of this species: Three specimens reared by J. F. Strauss from *Desmia funeralis*, at Washington, District of Columbia, under Quaintance No. 5534; two specimens reared by R. L. Webster from *Psorosina hammondi*, at Des Moines, Iowa; one specimen bred from white cocoons on *Desmia*, at Herndon, Virginia.

43. *APANTELES FUMIFERANAE* Viereck.

*Apantales fumiferanae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 139.

*Habitat.*—Canada; Oregon; Massachusetts; Maine.

*Host.*—*Harmologa fumiferana* Clemens (Viereck).

*Cocoons.*—White; solitary.

Besides the type series the National Collection contains one specimen of this species bearing the following data: Ashland, Oregon, C. Heinrich, collector, Hopk., U. S. No. 12522<sup>c</sup>, from Tortricid on *Pinus lambertiana*; and one specimen from Boston, Massachusetts, A. D. Hopkins, collector, Hopk. U. S. No. 9498<sup>o1</sup>. Through the kindness of Dr. Edith M. Patch the writer has also seen one specimen from the collection of the Maine Agricultural Experiment Station, which was reared from the spruce bud moth at Orono, Maine, June 28, 1912.

44. *APANTELES TRACHYNOTUS* Viereck.

*Apanteles (Apanteles) trachynotus* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 616.

*Habitat.*—New Jersey; Delaware; Connecticut; New York; Nova Scotia.

*Host.*—*Pegomyia vicina* has been given as the host of this species, on the authority of J. B. Smith, but this record is probably incorrect; no other species of the genus, so far as known, has been reared from

the larva of any order other than Lepidoptera, and it is very doubtful if parasitism by *Apanteles* extends to other orders.

There are in the National Collection, besides the type series, six specimens of this species, three of which were taken at Castle Rock, Delaware; the remaining three are without locality labels, but were doubtless collected in Illinois, since all three specimens bear Illinois numbers. The writer has also seen several male specimens in the collection of Cornell University, which were collected at Ithaca and McLean, New York. In the same collection are two males, collected at Truro, Nova Scotia, by Dr. R. Matheson, in July, 1913. The female of this species is unknown.

#### 45. APANTELES MIANTONOMOI Viereck.

*Apanteles (Apanteles) miantonomoi* VIERECK, Bull. 22, Connecticut State Geol. and Nat. Hist. Survey, 1916, pp. 190, 198.

*Apanteles (Apanteles) pequodorum* VIERECK, Bull. 22, Connecticut State Geol. and Nat. Hist. Survey, 1916, pp. 190, 198.

*Habitat*.—Connecticut.

*Host*.—Unknown.

Known only from the types in the Connecticut Agricultural Experiment Station, at New Haven, Connecticut, and one paratype in the United States National Museum.

After a careful study of the types of *miantonomoi* and *pequodorum* the writer is convinced that they represent the same species.

#### 46. APANTELES MELANOPUS Viereck.

*Apanteles (Apanteles) melanopus* VIERECK, Bull. 22, Connecticut State Geol. and Nat. Hist. Survey, 1916, pp. 190, 198.

*Habitat*.—Connecticut.

*Host*.—Recorded as bred from pupae of the cabbage butterfly; but, since the species of *Apanteles* are evidently exclusively parasitic on the larvae stage of their hosts, this record is open to doubt.

The species is known to the writer only from the type in the Connecticut Agricultural Experiment Station and a single paratype in the United States National Museum.

#### 47. APANTELES CACOECIAE Riley.

*Apanteles cacoeciae* RILEY, Trans. Acad. Sci., St. Louis, vol. 4, pt. 2, 1881, p. 306.—SLINGERLAND and CROSBY, Manual of Fruit Insects, 1914, p. 58.

*Habitat*.—Missouri; New York; Maryland; Michigan; Canada.

*Hosts*.—*Cacoecia semifera* Walker (Riley); *Tortrix*, species; *Paedisca*, species; (?) *Acrobasis caryae* Grote; *Bucculatrix pomifoliella* Clemens (Slingerland and Crosby).

*Cocoons*.—White, thin; firmly held together in small groups of three to six.

In addition to the type series the National Collection contains the following specimens of this species: Two specimens reared by T. H. Soden from *Tortrix*, species at Cohoes, New York, under Quaintance No. 9269; 13 specimens bearing Bureau of Entomology No. B212°, parasitic on *Paedisca* on *Solidago lanceolata*; 5 specimens reared by A. B. Gahan at College Park, Maryland, from cocoons on English walnut and believed to have been parasitic on *Aerobasis caryae*; 7 specimens collected at Agricultural College, Michigan; 2 specimens from southern Quebec, Canada; and 1 specimen from Monroe County, New York, reared from an unknown leaf-roller.

#### 48. APANTELES LACTEICOLOR Viereck.

*Apanteles* (*Apanteles*) *lactecolor* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 475.

*Apanteles lactecolor* VIERECK, Muesebeck, Journ. Agr. Research, vol. 14, 1918, p. 194.

*Habitat*.—Europe; New England.

*Hosts*.—*Euproctis chrysorrhoea* Linnaeus; *Porthetria dispar* Linnaeus; *Acronycta hasta* Guenée (Muesebeck); *Hyphantria textor* Drury.

*Cocoons*.—White; solitary.

In addition to the type series in the National Collection, the writer has seen several hundred specimens at the Gipsy Moth Laboratory, at Melrose Highlands, Massachusetts.

#### 49. APANTELES DIATRAEAE, new species.

*Female*.—Length, 2mm. Face punctate and shining; vertex strongly shining; antennae shorter than the body, mesoscutum flat, weakly punctate anteriorly, impunctate and polished behind; disk of scutellum wholly impunctate and highly polished; the lateral face of scutellum with the posterior polished area small, semicircular, and not extending anteriorly half way to the base of the disk; mesopleura exceedingly highly polished, with a very shallow polished depression posteriorly; propodeum finely roughened, shining, and with an elongate areola, which is margined by strong carinae, and is apparently confluent with the basal median area; radius of fore wing slightly longer than transverse cubitus, and uniting with the latter in a sharp angle; nervellus curving very strongly behind toward base of wing; posterior coxae smooth and shining; inner spur of posterior tibiae slightly longer than the outer, and almost half as long as the metatarsus; first abdominal tergite very narrow and parallel-sided, about as broad at apex as at base, the apical angles acute, the

tergite weakly roughened, and with a conspicuous shining median fovea on the posterior half; second tergite trapezoidal, as broad at base as first tergite is broad at apex, and a little broader at apex than at base, perfectly smooth and very highly polished like the remainder of the abdomen; ovipositor sheaths about half the length of the abdomen, sharply pointed at apex. Black; antennae brownish; tegulae black; wings hyaline, with the stigma and veins dark brown; legs entirely black, except the apex of fore femora and the fore tibiae and tarsi, which are rather yellowish, and the middle tibiae and tarsi, which are dusky; abdomen entirely black, including the membranous margins along the first and second abdominal tergites and the entire venter.

*Male*.—Antennae very much longer than in the female; otherwise essentially as in that sex.

*Cocoons*.—Dirty whitish, and cemented together in a long slender row, but not surrounded by loose silk.

*Type locality*.—Mercedes, Cuba.

*Type*.—Cat. No. 22521, U.S.N.M.

*Host*.—*Diatraea saccharalis* Fabricius.

Described from nine female and four male specimens bred by T. E. Holloway, September, 1918.

#### 50. APANTELES LASPEYRESIAE Viereck.

*Apanteles (Apanteles) laspeyresiae* VIERECK, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 556.

*Habitat*.—California.

*Host*.—(*Laspeyresia*) *Carpocapsa toreuta* Grote (Viereck).

Known to the writer from the type series, and a large amount of additional material in the United States National Museum, all reared from the same host in the same general locality.

#### 51. APANTELES TISCHERIAE Viereck.

*Apanteles (Apanteles) tischeriae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 140.

*Habitat*.—Delaware; Ohio; Connecticut.

*Host*.—*Tischeria malifoliella* Clemens.

Besides the type series the National Collection contains a single specimen from Wallingford, Connecticut, reared from *Tischeria malifoliella* by B. A. Porter, under Quaintance No. 16540, and a large series from Waterville, Ohio, reared in the insectary of the Agricultural College at Wooster, Ohio, under No. 3124, host and collector not indicated.

## 52. APANTELES ARISTOTELIAE Viereck.

*Apanteles (Apanteles) aristoteliae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 613.

*Apanteles (Apanteles) gelechiae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 615.

*Habitat.*—New Jersey; Connecticut; Pennsylvania; Michigan.

*Hosts.*—*Aristotelia fungivorella* Clemens (Viereck); *Gelechia trialba-maculella* Chambers (Viereck); *Gelechia confusella* Chambers; *Gelechia*, species.

In the opinion of the writer these two species can not be held distinct. The type of both species have been carefully studied.

In addition to the type material the National Collection contains specimens from Danville, Pennsylvania, reared under Hopk. U. S. No. 13908<sup>41</sup>, by A. B. Champlain, from a lepidopteron boring in pine cones; one specimen reared at Benton Harbor, Michigan, by H. G. Ingerson from *Gelechia confusella*, under Quaintance No. 12542; and a series also reared at Benton Harbor, Michigan, by H. G. Ingerson from *Gelechia* species under several Quaintance numbers.

## 53. APANTELES TERMINALIS (Gahan).

*Pseudapanteles terminalis* ASHMEAD MS., in Smith's Insects of New Jersey, 1899, p. 593.

*Apanteles (Pseudapanteles) terminalis* GAHAN, Proc. Ent. Soc. Wash., vol. 14, 1912, p. 2.

*Habitat.*—New York; Florida; Maryland; Kentucky; Illinois; Texas.

*Host.*—Unknown.

There are in the National Museum, besides the type series, one specimen collected at Victoria, Texas, by W. E. Hinds, and one specimen from southern Illinois collected by Charles Robertson. The writer has also seen three fine specimens of this species in the collection of the Kentucky Agricultural Experiment Station, at Lexington, Kentucky.

## 54. APANTELES FEMUR-NIGRUM (Provancher).

*Mierogaster femur-nigrum* PROVANCHER, Addit. faun. Canad. Hymenop., 1886, pp. 139, 142.

*Apanteles femur-nigrum* PROVANCHER, Addit. faun. Canad. Hymenop., 1888, p. 388.

*Habitat.*—Canada.

*Host.*—Unknown.

Type in the Provancher collection, at the Museum of Public Instruction at Quebec, and not seen by the writer. The species has been given its position in the key on the basis of the original description and notes by A. B. Gahan after a study of the type.



## 55. APANTELES PARALELLIS (Ashmead).

*Protapanteles paralellis* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 281.

*Habitat.*—St. Vincent.

*Host.*—Unknown.

Type in the British Museum and not examined; apparently the species is distinct and can be separated by the characters given in the table.

## 56. APANTELES NIGROVARIATUS, new species.

*Female.*—Length, 2.5 mm. Face closely, shallowly punctate and shining, hardly as broad at base of clypeus as long; vertex, temples, and cheeks closely punctate and opaque; antennae at least as long as the entire insect; mesoscutum uniformly closely shallowly punctate; disk of scutellum rather flat, and smooth, with only a few weak punctures; propodeum smooth and polished, but with a prominent median longitudinal carina extending from base to apex; mesopleura smooth and polished except for some scattered punctures anteriorly; forewing with the metacarpus much longer than the stigma, and the radius somewhat longer than the transverse cubitus; inner spur of posterior tibiae much longer than the outer, and as long as half the metatarsus; abdomen with the two basal tergites ruguloso-punctate, the third and following tergites smooth; first tergite about as broad at apex as at base, broadest medially, the sides being slightly curved outwardly, and at least one and one-half times as long as broad at apex; second tergite short, transverse, much broader than the first tergite, and at least four times as broad as long, the apical margin straight; ovipositor sheaths almost or quite two-thirds the length of the abdomen. Mostly red in color; head largely black, the antennae and face rather reddish-black; mesosternum dark reddish-brown; metanotum and propodeum black; legs dark reddish-testaceous; ovipositor sheaths black.

*Type locality.*—Mount Holly Springs, Pennsylvania.

*Type.*—Cat. No. 22522, U.S.N.M.

Described from one female specimen collected by R. M. Fouts, July 28, 1918.

## 57. APANTELES CONSIMILIS (Viereck).

*Pseudapanteles consimilis* ASHMEAD MS., in Smith's Insects of New Jersey, 1899, p. 593.

*Apanteles (Pseudapanteles) consimilis* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 177.

*Habitat.*—New York.

*Host.*—Unknown.

Known to the writer only from the unique type (female) in the United States National Museum, and two male specimens in the collection of Cornell University; these last were collected at McLean, New York.

## 58. APANTELES COCKERELLI, new species.

*Female*.—Length, 3 mm. Head, rostriform; face, closely minutely punctate and opaque; antennae about as long as the body; mesoscutum closely finely punctate; scutellum with the disk smooth medially, sparsely minutely punctate at the sides, and the lateral face with the posterior polished area large, but rounded in front, and not reaching two-thirds of the distance to the base of the disk; mesopleura wholly polished, shining; propodeum wholly impunctate, exceedingly highly polished; forewing with the radius much longer than the transverse cubitus; nervellus curving strongly behind toward base of wing; posterior coxae smooth and shining; inner spur of posterior tibiae slightly longer than the outer, but not half the length of the metatarsus; abdomen at least as long as the thorax; first tergite narrower at apex than at base, entirely smooth and highly polished; second tergite short and transverse, as broad at base as first tergite is broad at apex, and much broader at apex than at base, defined laterally by sharp oblique grooves, and more than three times as broad at apex as long down the middle, smooth and shining; membranous margins along the apical third of the first tergite and the entire length of the second broad; abdomen beyond the second tergite smooth and slightly opaque; ovipositor sheaths at least as long as the abdomen, slender; hypopygium projecting somewhat beyond the apex of the abdomen. Black; antennae and tegulae black; wings whitish-hyaline, with the stigma and the netacarpus brown, the veins colorless; legs mostly black except the apex of the fore femora, the entire fore tibiae and the basal half of the middle and hind tibiae, which are pale; abdomen, including the membranous margins along the two basal tergites, and the entire venter, black.

*Type locality*.—New Mexico.

*Type*.—Cat. No. 22523, U.S.N.M.

Described from one specimen collected by T. D. A. Cockerell, June 24, 1896.

## 59. APANTELES DAKOTAE, new species.

Very similar to *cockerelli*, but differs in the punctate propodeum and two basal abdominal tergites, and in the ovipositor sheaths being broader and only about two-thirds the length of the abdomen.

*Female*.—Length, 3.5 mm. Head rostriform; malar space long; face rather shagreened, shining; mesoscutum very minutely, closely punctate, rather shining; scutellum with the disk uniformly minutely punctate, and the lateral face with the posterior polished area large but rounded anteriorly and not extending nearly to the base of the disk; propodeum weakly punctate, without an areola or any carinae; forewing with the stigma large, the metacarpus decidedly longer

than the stigma, and the radius curved and about twice as long as the transverse cubitus; posterior coxae smooth and shining; spurs of posterior tibiae equal in length and almost half as long as the metatarsus; abdomen broad, the first tergite very large and very broad at base, punctate, more closely so in the middle, and without the median longitudinal depression present in many species; second tergite short, transverse, two and one-half times as broad at base as long down the middle, and at least four times as broad at apex as long down the middle, weakly punctate, and defined laterally by sharp oblique furrows; remainder of the abdomen smooth and shining; ovipositor sheaths broad, truncate at apex, and two-thirds the length of the abdomen. Black; antennae and tegulae black; wings whitish-hyaline, the stigma dark brown, and the veins colorless; legs, except the apex of the fore and middle femora, all the tibiae entirely and most of all tarsi, which are testaceous, black; abdomen wholly black, including the broad membranous margins along the two basal tergites and the entire venter.

*Type locality*.—Cedar Pass, South Dakota.

*Type*.—Cat. No. 22524, U.S.N.M.

Described from one specimen collected by W. H. Ober.

#### 60. APANTELES ANNULICORNIS (Ashmead).

*Pseudapanteles annulicornis* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 292.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

Represented in the United States National Museum by two cotype specimens; other cotypes are in the British Museum.

#### 61. APANTELES BRUNNEUS (Ashmead).

*Pseudapanteles brunneus* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 292.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

Type in the British Museum and not examined; but the species is apparently distinct.

#### 62. APANTELES SESIAE Viereck.

*Apanteles (Pseudapanteles) sesiae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 146.

*Habitat*.—Virginia; Florida.

*Host*.—(*Sesia*) *Synanthedon scitula* Harris (Viereck).

The National Collection contains in addition to the type series a single specimen of this species from Jacksonville, Florida.

## 63. APANTELES CHOREUTI Viereck.

*Apanteles (Pseudapanteles) choreuti* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 627.

*Habitat.*—New Jersey; Virginia; Florida.

*Host.*—*Choreutis carduiella* Kearfott (Viereck); *Desmia funeralis* Hübner.

Besides the types there is in the United States National Museum a single specimen of this species reared by R. A. Cushman at Vienna, Virginia, from *Desmia funeralis* under Quaintance No. 7883. The writer has also seen one male specimen in the Cornell University collection, which was collected by J. C. Bradley, at Sanford, Florida, March 28, 1914.

## 64. APANTELES SANCTI-VINCENTI Ashmead.

*Apanteles sancti-vincenti* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 279.

*Habitat.*—St. Vincent.

*Host.*—Unknown.

The type of this species is in the British Museum and has not been seen; the species has been given its position in the key on the basis of the original description.

## 65. APANTELES CINCTIFORMIS (Viereck).

*Apanteles (Protapanteles) cinctiformis* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 176.

*Habitat.*—Virginia; Michigan; Iowa; New York; Canada.

*Host.*—Unknown.

The National Collection contains, in addition to the type, the following specimens of this species: One specimen from Agricultural College, Michigan, host not indicated; one from Ottawa, also without further data; and one from the Iowa Agricultural Experiment Station, bearing Accession Cat. No. 776 of that institution. The writer has also seen eight female specimens in the collection of the Department of Entomology at Cornell University. These specimens were collected at Slaterville, Ithaca, and McLean, New York.

## 66. APANTELES PAPAIPEMAE, new species.

*Female.*—Length, 2.5 mm. Face but little broader than long, indistinctly punctate and strongly shining; vertex and temples practically impunctate and shining; antennae about as long as the body; mesoscutum very minutely punctate and strongly shining; scutellum with the disk practically impunctate, and with the lateral face mostly striate, the posterior polished area being very small; mesopleura only very weakly punctate anteriorly, smooth and polished behind; propodeum dull, weakly punctate on the anterior third, finely rugu-

lose on the remainder, and with a sharp median longitudinal carina from base to apex; metacarpus as long as the stigma; the radius perpendicular to the anterior margin of the wing, and about as long as the transverse cubitus; abdomen rather slender, strongly compressed; first tergite narrowing gradually from base to apex, where it is a little broader than the second tergite is long down the middle, smooth at base, ruguloso-striate on the posterior two-thirds; second tergite small, as broad at base as first tergite is broad at apex, and much broader at apex than at base, defined laterally by oblique grooves, and entirely rugulose; the membranous margins on the two basal abdominal tergites very broad; the third and following tergites smooth and very shining; hypopygium not projecting beyond the apex of the last dorsal segment; ovipositor sheaths more than one-third the length of the abdomen, and narrowing gradually toward tip. Mostly black; antennal scape yellowish; remainder of the antennae dark brown or black; tegulae pale yellow; wings slightly clouded, the veins and stigma brown; legs entirely, including all coxae, testaceous; membranous margins along the two basal abdominal tergites pale yellowish except for a brownish spot at either side of the second tergite; sides of the abdomen beneath yellow except at apex; keel blackish; ovipositor sheaths brownish-black.

*Male*.—Essentially as in the female.

*Cocoons*.—White; gregarious, and arranged parallel in a compact mass, but not inclosed in a ball of loose silk.

*Type locality*.—Rye, New York.

*Type*.—Cat. No. 22525, U.S.N.M.

*Hosts*.—*Papaipema maritima* Bird; *P. nebris* Guenée.

Described from many specimens of both sexes bred by Henry C. Bird.

67. APANTELES LUTEIPENNIS, new species.

*Female*.—Length, 2 mm. Face indistinctly punctate and opaque; vertex somewhat shining, weakly punctate; mesoscutum evenly punctate, the scutellar disk distinctly but more sparsely so; lateral aspect of scutellum with the posterior polished area distinctly smaller than the sculptured portion in front; both mesoscutum and scutellum opaque; propodeum dull, rugulose, with a distinct median longitudinal carina; forewing with the radius slightly longer than the transverse cubitus and tending somewhat toward base of wing; nervellus oblique but not strongly curved; posterior coxae smooth and shining; spurs of posterior tibiae short, much less than half the length of the metatarsus, the inner but very slightly longer than the outer; abdomen slender, somewhat compressed; the first tergite very narrow, much narrower at apex than at base, and at least twice as long as broad at base, the posterior half rugulose and dull; second tergite triangular, very narrow at base, and about as broad at apex

as long down the middle, slightly roughened and opaque; remainder of the abdomen smooth and shining; hypopygium not extending beyond the apex of the last dorsal segment; ovipositor subextended. Black; antennae entirely yellowish; tegulae testaceous; wings slightly luteous, the stigma and veins light brown; legs entirely pale testaceous, except most of the hind coxae, which are dark brown; membranous margins along the two basal abdominal tergites very pale yellowish; dorsal abdominal segments beyond the second castaneous.

*Cocoons*.—Small, white; gregarious, grouped together but not embedded.

*Type locality*.—Virginia.

*Type*.—Cat. No. 22526, U.S.N.M.

*Host*.—(?) *Argynnis*, species.

Described from five female specimens bred under Bureau of Entomology No. 3188, August 4, 1883.

#### 68. APANTELES LONGICORNIS (Provancher).

*Microgaster longicornis* PROVANCHER, Addit. faun. Canad. Hymenop., 1886, pp. 139, 143.

*Apanteles longicornis* PROVANCHER, Addit. faun. Canad. Hymenop., 1888, p. 388.

*Habitat*.—Canada.

*Host*.—Unknown.

Type in the Museum of Public Instruction at Quebec, Canada, and not examined. The species has been placed in the table on the basis of the original description and notes made by A. B. Gahan after a study of the type. It appears to be very similar to *radiatus*, but is probably distinct, apparently having clear hyaline wings.

#### 69. APANTELES RADIATUS Ashmead.

*Apanteles radiatus* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 162.

*Habitat*.—New Hampshire; Illinois; Virginia; New York.

*Host*.—Unknown. The type series was recorded from "a lepidopterous larva feeding on *Plantago major*."

The National Collection contains, in addition to the type series, two specimens of this species from Illinois, and one from Arlington, Virginia, without further data.

#### 70. APANTELES FLAVOVARIATUS, new species.

Very similar to *papaipemae*, from which it differs in lacking the prominent median longitudinal carina on the propodeum, and in the second abdominal tergite being only half as broad at base as long down the middle.

*Female*.—Length, 3.3 mm. Face hardly broader than long, shining; vertex, temples, and cheeks smooth and shining; mesoscutum very weakly punctate and shining; scutellar disk indistinctly

punctate; the sloping lateral face of scutellum with the posterior polished area much smaller than the sculptured area in front; mesopleura highly polished, with a short oval longitudinal depression posteriorly; propodeum very weakly punctate, without areola or costulae, shining; radius of forewing about as long as the transverse cubitus, and uniting with it in a strong angle; nervellus curving rather strongly behind toward base of wing; posterior coxae large, smooth, and shining; inner spur of posterior tibiae a little longer than the outer, and slightly longer than half the metatarsus; abdomen exceedingly strongly compressed; first tergite narrowing toward apex, and more than twice as long as broad at base, weakly punctate on apical half; second tergite triangular, defined laterally by sharp furrows, about half as broad at base as long down the middle, and as broad at apex as long down the middle, and very weakly striate at the sides; membranous margins along the two basal abdominal tergites very broad; third and following dorsal segments smooth and shining; hypopygium somewhat projecting; ovipositor sheaths distinctly exerted but short. Black; antennal scape somewhat yellowish below; tegulae and wing-bases testaceous; stigma and veins brown; legs wholly testaceous, except the extreme base of posterior coxae; lateral membranous margins on the two basal abdominal tergites pale flavous; third abdominal tergite brownish-testaceous; sides and venter of abdomen flavous except at apex.

*Male*.—Like the female in all essential characters.

*Cocoons*.—Glossy white, with very little loose silk; probably gregarious.

*Type locality*.—Michigan.

*Type*.—Cat. No. 22527, U.S.N.M.

Described from seven female and two male specimens from the Ashmead collection. Two of the paratype specimens are labeled as having been collected on Mount Angel, in Oregon.

#### 71. APANTELES NEOMEXICANUS, new species.

*Female*.—Length, 3.5 mm. Face slightly broader than long, weakly punctate, and opaque; vertex rather closely punctate; mesoscutum very minutely evenly punctate and shining; scutellar disk slightly convex, with a few scattered indistinct punctures; the lateral face of scutellum with the sculptured area much larger than the posterior polished portion; propodeum closely punctate, opaque; anterior wing with the metacarpus distinctly longer than the stigma, and the radius about as long as the transverse cubitus; nervellus curving strongly behind toward base of wing; posterior coxae large, finely punctate and shining; spurs of posterior tibiae about equal in length and almost half as long as the metatarsus; abdomen slender, somewhat compressed; the first tergite narrower

at apex than at base, and at least twice as long as broad at base, punctate and shining; second tergite subtriangular, defined laterally by sharp oblique grooves, about as broad at base as long, and at least one and one-half times as broad at apex as long down the middle, the apical margin arcuate, the tergite mostly smooth and shining; third and following dorsal segments smooth and shining; hypopygium rather stout, not extending beyond apex of the last dorsal abdominal segment; ovipositor very strongly curved, sickle-like, the sheaths broad and about two-thirds the length of the abdomen. Black; antennae wholly black; tegulae testaceous; wings very faintly clouded, the stigma and veins brown; legs reddish-testaceous, except the posterior coxae, which are black or blackish, and the posterior tarsi, which are slightly dusky; ovipositor sheaths black; sides of abdomen beneath largely yellowish; the broad lateral membranous margins on the two basal abdominal tergites pale.

*Cocoons*.—White; with no loose silk; apparently solitary.

*Type locality*.—Santa Fe, New Mexico.

*Type*.—Cat. No. 22528, U.S.N.M.

Described from five female specimens collected by T. D. A. Cockrell, August 14, 1895. Ashmead's manuscript name has been adopted.

#### 72. APANTELES SARROTHRIPAE Weed.

*Apanteles sarrothripae* WEED, Bull. Ill. State Lab. Nat. Hist., vol. 3, 1897, p. 3.

*Habitat*.—Illinois; Massachusetts; Michigan.

*Hosts*.—*Sarrothripa revayana* Scopoli; *Ichthyura inclusa*, Hübn.; *Peronea permutana* Duponchel.

*Cocoons*.—Whitish; gregarious but not embedded in silk.

In addition to two cotypes of this species the National Collection contains a large series of specimens bearing Bureau of Entomology No. 3981<sup>o</sup>, recorded as parasitic on *Sarrothripa revayana*; four specimens without locality label, but which are said to have been reared from *Peronea permutana*; and one specimen from Agricultural College, Michigan, bearing Accession No. 743<sup>a</sup> and said to have been reared from a locust leaf-miner. The writer has also seen a large series in the collection of the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts. These specimens were bred from *Ichthyura inclusa* at Lynnfield, Massachusetts.

#### 73. APANTELES ALTICOLA (Ashmead).

*Protapanteles alticola* ASHMEAD, Proc. Wash. Acad. Sciences, vol. 4, 1902, p. 248.

*Habitat*.—Alaska; Utah.

*Host*.—*Chorizagrotis*, species.

The National Collection contains, besides the type series, a single specimen of this species from Nephi, Utah, reared by C. N. Ainslie from *Chorizagrotis*, species, under Webster No. 6662.



## 74. APANTELES ETIELLAE (Viereck).

*Apanteles (Pseudapanteles) etieliae* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 178.

*Apanteles iselyi*, CUSHMAN, Proc. Ent. Soc. Wash., vol. 21, 1919, p. 120.

*Habitat*.—Washington; Arkansas; Iowa.

*Hosts*.—*Etiella schisticolor* Zeller (Viereck); (*Canarsia*) *Psorosina hammondi* Riley (Cushman).

After a careful study of the types of these two species the writer is convinced that they can not be held distinct.

The following specimens are contained in the United States National Museum collection in addition to the types: One specimen from Bentonville, Arkansas, reared under Quaintance No. 16356 from *Canarsia*, species, and two specimens from Shenandoah, Iowa, reared by R. L. Webster under Experiment No. 333, from *Psorosina hammondi*.

## 75. APANTELES CASSIANUS Riley.

*Apanteles cassianus*, RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 387; in Scudder, Butterflies U. S., 1889, p. 1909.

*Habitat*.—Illinois; Colorado; Iowa.

*Hosts*.—*Eurema nicippe* Cramer (Riley); *Eurymus eurytheme* Boisduval (Riley).

Besides the type series, the National Collection contains one specimen of this species collected by S. H. Scudder at Bruce, Colorado; one specimen from Ames, Iowa, collector unknown, but bearing Experiment Station Catalogue No. 801; also several additional specimens without definite data.

## 76. APANTELES VICTORIAE, new species.

*Female*.—Length, 3 mm. Head shining, weakly punctate; antennae not quite as long as the body; mesoscutum opaque, with numerous minute punctures, rather smooth posteriorly; disk of scutellum flat, indistinctly punctate, shining; mesopleura almost entirely smooth and shining; propodeum almost impunctate and without a trace of a median carina, smooth and shining; forewing with the metacarpus distinctly longer than the stigma; the radius a little longer than the transverse cubitus; spurs of the posterior tibiae about equal in length and distinctly shorter than half the metatarsus; abdomen long, slender, somewhat compressed; the first tergite narrowing gradually from base to apex, where it is about as broad as the second tergite is long down the middle, punctate except on the basal half, where it is smooth and polished; second tergite a little broader at base than long down the middle, defined laterally by sharp oblique grooves, about twice as broad at apex as at base, and punctate; lateral membranous margins on the two basal abdominal

tergites very broad; third and following dorsal abdominal segments smooth and shining; ovipositor sheaths almost as long as the abdomen, broadening to near the tip and then narrowing again. Black; antennae wholly black; tegulae black; wings decidedly infumated; legs black, except the apex of the fore femora and most of the fore tibiae, and the extreme base of the middle and posterior tibiae, which are yellowish; abdomen entirely black above and below; ovipositor sheaths black.

*Type locality*.—Victoria, Vancouver.

*Type*.—Cat. No. 22529, U.S.N.M.

Described from one female specimen from the Ashmead collection. Ashmead's manuscript name has been used.

77. APANTELES MONTICOLA Ashmead.

*Apanteles monticola* ASHMEAD, Bull. Colorado Biol. Assoc., vol. 1, 1890, p. 17.

*Habitat*.—Colorado.

*Host*.—Unknown.

Known only from the unique type in the United States National Museum.

78. APANTELES GLACIALIS (Ashmead).

*Protapanteles glacialis* ASHMEAD, Proc. Wash. Acad. Sciences, vol. 4, 1902, p. 248.

*Habitat*.—Alaska.

*Host*.—Unknown.

Very similar to *ornigis* Weed, but probably distinct, as shown in the key.

Known only from the type specimen in the United States National Museum.

79. APANTELES FELTIAE (Viereck).

*Apanteles (Protapanteles) feltiae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 625.

*Habitat*.—Indiana.

*Host*.—*Feltia*, species.

Known only from the unique type in the United States National Museum.

80. APANTELES NIGER, new species.

Very similar to *victoriae*; but differs from that species in the hyaline wings, in the shorter ovipositor sheaths, in the disk of scutellum being less smooth, and in the metacarpus being distinctly shorter than the stigma.

*Female*.—Length, 2.7 mm. Face closely finely punctate, somewhat shining; clypeus indistinctly separated from face; vertex, temples, and cheeks finely punctate and shining; mesoscutum long, at least as long as broad very closely finely punctate and opaque; scutellar

disk slightly longer than broad at base, almost flat, with numerous well-defined punctures; the suture at the base of scutellum very narrow, so that the numerous pits within are scarcely distinguishable; lateral face of the scutellum with the sculptured portion distinctly larger than the semicircular polished area behind; mesopleura mostly polished, with a shallow longitudinal depression posteriorly; propodeum mostly smooth and shining, with scattered punctures; metacarpus shorter than the stigma, the radius about equal in length to the transverse cubitus; posterior coxae mostly smooth and shining; spurs of posterior tibiae equal in length and half as long as the metatarsus; abdomen compressed on the apical half; first tergite distinctly narrower at apex than at base, and hardly twice as long as broad at base, punctate posteriorly, and with a shallow, median longitudinal depression on the apical third; second tergite short and transverse, at least three times as broad at apex as long down the middle, longer medially than at the sides, the posterior margin being arcuate, the plate more or less punctate; remainder of the abdomen smooth and shining; hypopygium projecting somewhat beyond the apex of the last dorsal segment; ovipositor sheaths broad, two-thirds the length of the abdomen. Entirely black, including the antennae, the tegulae, all legs entirely, and the abdomen above and below; wings hyaline, stigma and veins brown.

*Male*.—Differs from the female only in the narrower abdomen, and in the second abdominal tergite being smoother and not so short and broad.

*Type locality*.—Onaga, Kansas.

*Allotype locality*.—Brookings, South Dakota.

*Type*.—Cat. No. 22530, U.S.N.M.

Described from one female and two male specimens received from the Ashmead collection.

81. APANTELES SCUTELLARIS, new species.

*Female*.—Length, 2.6 mm. Face short and broad, very minutely and closely punctate and shining; vertex and temples indistinctly punctate; antennae very short, distinctly shorter than the body; mesoscutum uniformly very shallowly punctate; scutellar disk large, broad at base, rather flat, and covered with minute shallow punctures; lateral face of scutellum with the anterior sculptured portion larger than the polished area behind; mesopleura very weakly minutely punctate on the anterior half, polished behind, and with a broad, very shallow, shining longitudinal depression; propodeum punctate, slightly rugulose medially, with a suggestion of a median longitudinal carina; metacarpus hardly as long as stigma; radius very slightly longer than transverse cubitus, and uniting with the latter in a rather sharp angle; nervellus oblique but not strongly curved; posterior coxae smooth and very shining; spurs of

posterior tibiae equal in length and almost half as long as the metatarsus; abdomen rather broad; first tergite much narrower at apex than at base, hardly twice as long as broad at base, smooth and shining on basal half, punctate and opaque on apical half; second tergite short and transverse, much narrower at extreme base than at apex, about four times as broad at apex as long down the middle, and much longer medially than at the sides, the posterior margin being arcuate, the plate at least somewhat rugulose on the apical half; lateral membranous margins along the two basal abdominal tergites very broad; third and following tergites smooth and shining; hypopygium slightly projecting; ovipositor sheaths two-thirds the length of the abdomen. Black; antennae wholly black; tegulae black; wings hyaline, stigma and veins yellowish-brown; legs black, except the apex of the fore and middle femora and all the tibiae mostly, which are yellowish; venter of the abdomen entirely black; ovipositor sheaths black.

*Male*.—Differs only in having the antennae long than the body, and the second abdominal tergite relatively longer and narrower and more smooth and shining.

*Type locality*.—Pasadena, California.

*Type*.—Cat. No. 22531, U.S.N.M.

*Host*.—*Phthorimaea operculella* Zeller.

Four female and three male specimens bred by J. E. Graf in the Bureau of Entomology, and recorded under Chittenden No. 2230 07.

#### 82. APANTELES THORACICUS, new name.

*Pseudapanteles sancti-vincenti* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 291 (not *Apanteles sancti-vincenti* Ashmead, Trans. Ent. Soc. London, 1900, pt. 2, p. 279).

*Habitat*.—St. Vincent.

*Host*.—Unknown.

Represented in the National Collection by a single cotype; other cotypes are in the British Museum.

#### 83. APANTELES STAGMATOPHORAE Gahan.

*Apanteles stagmatophorae* GAHAN, Proc. U. S. Nat. Mus., vol. 55, 1919, p. 120.

*Habitat*.—Maryland.

*Host*.—*Stagmatophora gleditschiaeella* Chambers (Gahan).

Known only from the type series in the United States National Museum.

#### 84. APANTELES COMPRESSUS Muesebeck.

*Apanteles compressus* MUESEBECK, Can. Ent., vol. 51, 1919, p. 114.

*Habitat*.—Massachusetts; New Hampshire; Rhode Island.

*Host*.—*Hypoprepia*, species (Muesebeck).

*Cocoons*.—White; gregarious, closely fastened together.

The type and four paratypes of this species are in the United States National Museum; the remaining paratypes are in the collection of the Gipsy Moth Laboratory, Melrose Highlands, Massachusetts.

85. APANTELES COMPRESSIVENTRIS, new species.

*Female*.—Length, 2.6 mm. Face impunctate and strongly shining, a strong median ridge arising just below the insertion of the antennae, and extending halfway to the clypeus; clypeus conspicuously separated from the face; temples broad; vertex, temples, and cheeks, impunctate, very shining; mesoscutum weakly punctate and shining; disk of scutellum slightly convex, impunctate and polished; mesopleura polished; propodeum very feebly punctate and strongly shining, without an areola or any carinae; metacarpus about as long as the stigma, or only indistinctly longer; radius of forewing about equal in length to the transverse cubitus and making a strong angle with the latter; nervellus behind curving toward base of wing; posterior coxae indistinctly punctate and shining; inner spur of posterior tibiae distinctly longer than the outer, but hardly half the length of the metatarsus; entire abdomen exceedingly strongly compressed; first tergite very slender, narrowing gradually toward apex, where it is much narrower than at base, distinctly more than twice as long as broad at base, rather ruguloso-punctate laterally; second tergite small, defined laterally by oblique grooves that diverge posteriorly, less than half as broad at base as long down the middle, and slightly broader at apex than long down the middle, smooth and polished medially; lateral membranous margins along the two basal abdominal tergites broad; third and following tergites smooth and shining; hypopygium extending a little beyond the apex of the last dorsal segment; ovipositor very slightly projecting. Black; antennae wholly black; tegulae and wing-bases dark brown; wings feebly yellowish-hyaline, stigma and veins brown; all coxae black; posterior trochanters brown; remainder of the legs dark reddish-testaceous, except the apex of the posterior tibiae and the posterior tarsi, which are fuscous; venter of the abdomen black; lateral membranous margins along the two basal abdominal tergites testaceous.

*Male*.—As in the female, except that the legs are somewhat more dusky, the posterior femora being edged with blackish.

*Type locality*.—Mount Washington, New Hampshire.

*Type*.—Cat. No. 22532, U.S.N.M.

*Host*.—"Arctiid."

Described from many specimens of both sexes.

## 86. APANTELES PHIGALIAE Muesebeck.

*Apanteles phigaliae* MUESEBECK, Can. Ent., vol. 51, 1919, p. 113.

*Habitat.*—Massachusetts.

*Host.*—*Phigalia titea* Cramer (Muesebeck).

*Cocoons.*—Light brown; the surface uneven, being furrowed longitudinally; gregarious, but with no loose silk.

Known only from the type series, of which the type and four paratypes are in the United States National Museum, and the remaining paratypes in the collection of the Gipsy Moth Laboratory at Melrose Highlands, Massachusetts.

## 87. APANTELES ALASKENSIS (Ashmead).

*Protapanteles alaskensis* ASHMEAD, Proc. Wash. Acad. Sciences, vol. 4, 1902, p. 247.

*Habitat.*—Alaska.

*Host.*—Unknown.

Known only from the types in the National collection.

## 88. APANTELES POLITUS Riley.

*Apanteles politus* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 307.

*Habitat.*—Missouri; Illinois.

*Host.*—*Scolecocampa liburna* Geyer (Riley).

*Cocoons.*—Dirty whitish; gregarious, in irregular masses.

Represented in the National collection by a large type series, and also by four specimens collected at Champaign, Illinois; collector not indicated.

## 89. APANTELES MILITARIS (Walsh).

*Microgaster militaris* WALSH, Insect. Injur. Vegt. Illinois, 1861, p. 27; Riley, 2d Rep. Insects Missouri, 1870, p. 52.

*Microgaster (Apanteles) militaris* Walsh, RILEY, 3d Rep. U. S. Ent. Commiss., 1883, pp. 126-127.

*Habitat.*—Illinois; Missouri; New York; Massachusetts; Tennessee; Virginia; Oklahoma; Connecticut; New Jersey. Apparently widely distributed over the entire United States.

*Hosts.*—*Cirphis unipuncta* Haworth; *C. phragmatidicola* Guenée; *Laphygma frugiperda* Smith and Abbot; *Heliothis obsoleto* Fabricius; *Chorizagrotis*, species.

*Cocoons.*—Color buff to dirty whitish; gregarious, but not imbedded.

In addition to the large type series, the National Collection contains numerous series of this well-known species reared from the Army worm, *Cirphis unipuncta*, in widely distributed localities; also a series said to have been reared from *Laphygma frugiperda* at Nash-

ville, Tennessee, by G. G. Ainslie, under Webster No. 9820; a series reared by R. C. Smith at Charlottesville, Virginia, under Webster No. 9380, supposedly from *Heliothis obsoleta*; a series from Shawnee, Oklahoma reared by W. E. Pennington from *Chorizagrotis*, species under Webster No. 12756, and a series reared under Bureau of Entomology No. 2548, from *Cirphis phragmatidicola*.

96. APANTELES FLORIDANUS, new species.

Resembles *militaris* very closely, differing only in having black posterior coxae; this character, however, is apparently constant.

*Female*.—Length, 2.3 mm. Face somewhat broader than long, weakly punctate and very shining; vertex and temples indistinctly punctate and shining; mesoscutum closely punctate anteriorly, weakly so posteriorly; disk of scutellum rather flat, sparsely punctate, somewhat opaque; mesopleura punctate and dull anteriorly, smooth and polished on posterior half, and with a conspicuous, deep, longitudinal depression below; propodeum dull, punctate at base, very finely rugulose behind, without an areola, and with a faint suggestion of a median longitudinal carina posteriorly; forewing with the stigma broad, and the radius slightly longer than the transverse cubitus; nervellus oblique but not distinctly curved; posterior coxae largely smooth and polished, with a distinct oval, flattened area on the outer face above at base; inner spur of posterior tibiae longer than the outer, and almost half the length of the metatarsus; abdomen with the first tergite very slender, narrowing steadily from base to apex, so that it is much narrower at apex than at base, at least twice as long as broad at base, entirely smooth and very highly polished; second tergite triangular, defined laterally by sharp oblique grooves that diverge posteriorly, about twice as long as broad at base, and about twice as broad at apex as long down the middle, perfectly smooth and highly polished like the remainder of the abdomen; lateral membranous margins of the two basal abdominal tergites very broad; hypopygium not extending beyond the apex of the abdomen; ovipositor not exerted. Black; tegulae pale brown; wings hyaline, stigma and veins brown; fore and middle coxae yellow; posterior coxae dark brown above and deep black beneath; remainder of the legs stramineous, except that apex of posterior femora and of posterior tibiae are somewhat dusky; lateral membranous margins along the two basal abdominal tergites bright testaceous; abdominal tergites with a faint castaneous tinge; sides of the venter at the base testaceous.

*Male*.—Essentially as in the female.

*Cocoons*.—Buff in color, gregarious, and loosely heaped together, as in *militaris*.

*Type locality*.—Archer, Florida.

*Type*.—Cat. No. 22533, U.S.N.M.

*Host*.—"Noctuid."

Described from many specimens of both sexes bred from cocoons. Ashmead's manuscript name has been used.

91. *APANTELES SORDIDUS* Ashmead.

*Apanteles sordidus* ASHMEAD, TRANS. ENT. SOC. LONDON, 1900, pt. 2, p. 279.

*Habitat*.—St. Vincent.

*Host*.—Unknown.

The type of this species is in the British Museum, and has not been seen by the writer. The species has been placed in the key on the basis of the original description.

92. *APANTELES NIGRICORNIS*, new species.

*Female*.—Length, 2.4 mm. Face somewhat punctate, shining, with a distinct median longitudinal ridge just below the insertion of the antennae; antennae much longer than the body; vertex, temples, and cheeks weakly punctate and shining; mesoscutum shining, shallowly punctate, the punctures becoming less distinct posteriorly; disk of scutellum somewhat convex, indistinctly punctate, rather shining; mesopleura mostly smooth and polished, with a conspicuous, non-crenulate, longitudinal depression posteriorly; propodeum without an areola, punctate, with slight rugulosity posteriorly in the middle, dull, except the apical lateral areas, which are shining; radius at least no longer than transverse cubitus; nervellus slightly curved behind toward base of wing; posterior coxae mostly smooth and polished, without the flattened area at base common to many species; inner spur of posterior tibiae longer than the outer and half the length of the metatarsus; abdomen rather slender; first tergite very narrow, much narrower at apex than at base, more than twice as long as broad at base, and mostly smooth and polished, there being only a few weak punctures laterally near the apex; second tergite small, triangular, defined laterally by sharp oblique grooves, very narrow at extreme base, and hardly as broad at apex as long down the middle, smooth and polished like the remainder of the abdomen; lateral membranous margins along the apical half of the first tergite and the entire length of the second very broad; ovipositor hardly exerted. Black; antennae entirely black; tegulae blackish; wings hyaline, the stigma and veins brown; legs testaceous, except all coxae, which are black, and the extreme apex of the posterior femora and of posterior tibiae, and practically all of the posterior tarsi, which are slightly dusky; lateral membranous margins along the two basal abdominal tergites rather fusco-testaceous; third tergite with a more or less distinct testaceous spot on either side.



*Male*.—Essentially as in the female, except that the first abdominal tergite is not at all punctate at the sides and the third tergite is entirely black.

*Cocoons*.—Very dark brownish gray, covered with pale gray silk; gregarious but not embedded in silk.

*Type locality*.—Ventura, California.

*Type*.—Cat. No. 22534, U.S.N.M.

*Host*.—*Ctenucha brunnea* Stretch, on authority of E. O. Essig.

Described from two females and one male bred from cocoons by S. H. Essig.

93. APANTELES WEBSTERI, new species.

*Female*.—Length, 2.3 mm. Face hardly broader than long, weakly punctate, somewhat shining, and with a more or less distinct median ridge; vertex with shallow punctures, opaque; mesoscutum punctate, indistinctly so posteriorly, dull; disk of scutellum somewhat convex, indistinctly punctate and shining; mesopleura largely smooth and very shining, the longitudinal depression having within it numerous very fine, transverse, curved striulae; propodeum smooth and shining, with only a few scattered, indistinct punctures, and without an areola; radius longer than transverse cubitus; nervellus not distinctly curved; posterior coxae smooth and polished, with a conspicuous flattened area at base above; inner spur of posterior tibiae distinctly longer than the outer and slightly more than half the length of the metatarsus; abdomen slender; first tergite very narrow, much narrower at apex than at base, more than twice as long as broad at base, entirely smooth, and highly polished; second tergite small, triangular, defined laterally by sharp, oblique grooves, very narrow at extreme base, and about as broad at apex as long down the middle, perfectly smooth, and very highly polished; lateral membranous margins along the apical half of the first tergite and the entire length of the second broad; third and following tergites very smooth and shining; ovipositor subexserted. Black; antennae rather brownish; wings hyaline, the stigma and veins brown; legs testaceous, except the brownish fore and middle coxae, the black hind coxae, the dusky apex of posterior femora and of posterior tibiae, and the slightly dusky posterior tarsi; sides of the venter of the abdomen yellowish on basal half.

*Male*.—Essentially as in the female.

*Cocoons*.—Dark brown in color; gregarious and cemented together side by side, with no loose silk.

*Type locality*.—(?) Ohio.

*Type*.—Cat. No. 22535, U.S.N.M.

*Host*.—"Geometrid."

Described from three female and five male specimens bred by Prof. F. M. Webster February 1, 1885.

## 94. APANTELES CAFFREYI, new species.

Very close to *nigricornis*; the striking cocoons of the two species are almost identical. The adult differs in the shorter antennae, in the pale tegulae, in the radius being longer than transverse cubitus, and in the first abdominal tergite not narrowing gradually from base to apex.

*Female*.—Length, 2.2 mm. Face slightly broader than long, weakly punctate; vertex, temples, and cheeks punctate and opaque; mesoscutum punctate, more weakly so posteriorly; disk of scutellum slightly convex, about as broad at base as long, indistinctly punctate, and not strongly shining; mesopleura punctate anteriorly, polished behind; propodeum weakly punctate, with a few radiating striulae arising at the middle of the posterior margin, and extending forward; propodeal areola wanting; metacarpus distinctly longer than the stigma and the radius longer than the transverse cubitus; nervellus slightly curved behind toward base of wing; posterior coxae smooth and polished, with a narrow flattened area on outer upper edge at base; inner spur of posterior tibiae slightly longer than the outer and at least half as long as the metatarsus; abdomen slender; first tergite very narrow and much narrower at apex than at base, two and one-half times as long as broad at base, and perfectly smooth and polished; second tergite triangular, defined laterally by sharp oblique grooves, less than half as broad at base as long, and about as broad at apex as long; the second tergite, like the remainder of the abdomen, entirely smooth and polished; lateral membranous margins along the apical third of the first tergite and the entire length of the second, very broad; ovipositor subexserted. Black; antennae black, except the scape, which is reddish beneath; tegulae and wing bases pale testaceous; wings hyaline, the stigma and veins pale brown; legs yellowish, except all coxae, which are black, and the apex of the posterior femora and of posterior tibiae, and most of the posterior tarsi, which are dusky; the lateral membranous margins on the two basal abdominal tergites pale testaceous, this color extending along the sides of the third tergite as well.

*Male*.—Differs from the female only in the usual sexual characters.

*Cocoons*.—Dark brownish-gray, covered with threads of pale gray silk; gregarious and cemented together, but not embedded in silk.

*Type locality*.—Tempe, Arizona.

*Type*.—Cat. No. 22536, U.S.N.M.

Described from two female and one male specimens bred by D. J. Caffrey from collected cocoons.

## 95. APANTELES HERBERTII Ashmead.

*Apanteles herbertii* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, p. 279.

*Habitat.*—St. Vincent; Grenada.

*Host.*—Unknown.

The only specimens of this species that have been seen by the writer are two cotypes in the National Collection. Other cotypes are in the British Museum.

## 96. APANTELES GILLETTEI Baker.

*Apanteles gillettei* BAKER, Ent. News, vol. 6, 1895, p. 202.

*Habitat.*—Colorado.

*Host.*—*Cacoecia argyrospila* Walker (Baker).

Known only from the type series in the United States National Museum.

## 97. APANTELES PARASTICHTIDIS, new species.

*Female.*—Length, 2.8 mm. Face broad, weakly punctate, and shining; antennae shorter than the body, the five or six apical segments broader than long; vertex and temples broad, weakly punctate, and shining; mesoscutum very shallowly punctate, strongly shining; scutellum with the disk slightly convex, with only a few scattered indistinct punctures, and very shining, and the lateral face with the posterior polished area small and semicircular in shape; mesopleura very highly polished; propodeum smooth and shining at extreme base, uniformly rugulose behind, and with a distinct median longitudinal carina, the areola wanting; stigma large; the radius longer than the transverse cubitus, with which it makes a sharp angle; nervellus curving somewhat toward base of wing; posterior coxae slightly granular but shining; inner spur of posterior tibiae slightly longer than the outer and half as long as the metatarsus; abdomen very long and slender, distinctly longer than the thorax, and about five times as long as broad in the widest part; first tergite somewhat broader at apex than at base, entirely finely ruguloso-striate; second tergite subtrapezoidal, also uniformly finely ruguloso-striate and opaque; remainder of the abdomen perfectly smooth and very highly polished; abdomen strongly compressed on the apical half; ovipositor very slightly exerted. Black; antennae brown; tegulae blackish; wings hyaline, with the stigma and veins dark brown; legs entirely testaceous, except all coxae, which are black.

*Cocoons.*—White and thin; gregarious, but not embedded in a mass of silk.

*Type locality.*—Parksville, Tennessee.

*Type.*—Cat. No. 22537, U.S.N.M.

*Host.*—*Parastichtis bicolorago* Guenée.

Described from six female specimens in the United States National Museum.

## 98. APANTELES PHOLISORAE Riley.

*Apanteles pholisora* RILEY, in Scudder, Butterflies U. S., 1889, p. 1904.

*Habitat*.—Illinois; Missouri; South Carolina.

*Host*.—*Pholisora catullus* Fabricius (Riley).

*Cocoons*.—White; gregarious, but not embedded in silk.

In addition to the type series the National Collection contains specimens of this species from Champaign, Illinois, reared from *Pholisora catullus*; specimens reared by Miss Mary E. Murtfeldt at Kirkwood, Missouri, from the same host; and one specimen from Batesburg, South Carolina, collected by E. S. G. Titus.

## 99. APANTELES JUNONIAE Riley.

*Apanteles junonia* RILEY, in Scudder, Butterflies U. S., 1889, p. 1904.

*Habitat*.—United States.

*Host*.—*Junonia coenia* Hübner (Riley).

The type specimen, in the United States National Museum, is not in good condition, and apparently not a normal specimen. It is the only known representative of the species; and while it seems to be distinct, further study may indicate that it is not.

## 100. APANTELES LUNATUS (Packard).

*Microgaster (Apanteles) lunatus* PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, 1881, p. 28.

*Apanteles lunatus* Packard, WEED, Trans. Amer. Ent. Soc., vol. 15, 1888, p. 295.—RILEY, in Scudder, Butterflies U. S., 1889, p. 1903.

*Habitat*.—Massachusetts; Iowa; Illinois; New York; Connecticut; California; Washington.

*Hosts*.—*Papilio polyxenes* Fabricius (Riley); *P. zolicaon* Boisduval; *P. oregonia* Edwards.

*Cocoons*.—Yellowish, often angular; solitary.

Besides the type series there are in the National Collection four specimens from California—Ricksecker, collector—reared from *Papilio zolicaon*, and three specimens from Wenatchee, Washington, reared by E. J. Newcomer from *Papilio oregonia* under Quaintance No. 11485. The writer has also seen specimens of this species in the collections of the Iowa and Illinois Agricultural Experiment Stations and of Cornell University.

## 101. APANTELES LIMENITIDIS (Riley).

*Microgaster limenitidis* RILEY, 3d Ann. Rep. Insects Missouri, 1871, p. 158.

*Apanteles limenitidis* Riley, PACKARD, Proc. Boston Nat. Hist. Soc., vol. 21, 1881, p. 28; Riley, in Scudder, Butterflies U. S., 1889, p. 1902.

*Habitat.*—Connecticut; Missouri; Massachusetts

*Host.*—*Basilarchia archippus* Cramer.

*Cocoons.*—Pale yellow; solitary.

Represented in the National Collection by the type series only; it has, however, been recorded from the above-named host in Connecticut, and the writer has seen a specimen, reared from the same host in Massachusetts, in the collection of the Gipsy Moth Laboratory at Melrose Highlands, Massachusetts.

## 102. APANTELES AGRICOLA (Viereck).

*Apanteles (Protapanteles) agricola* VIIECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 186, 192.

*Habitat.*—Connecticut.

*Host.*—Unknown.

Known only from the unique type, which is in the collection of the Connecticut Agricultural Experiment Station.

The species is very similar to *nemoriac*, from which it appears to differ only in being not so deep black; it may ultimately prove to be that species.

## 103. APANTELES NEMORIAE Ashmead.

*Apanteles nemoriac* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 160.—DIMMOCK, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 152.

*Apanteles (Protapanteles) winkleyi* VIIECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 186 and 192.

*Habitat.*—New Hampshire; Connecticut; Tennessee; District of Columbia.

*Hosts.*—(*Nemoria*) *Haematopis grataria* Fabricius; *Eupithecia miserulata* Grote; *Pleuroprucha insulsaria* Guenée; *Chlorochlamys chloroleucaria* Guenée (Dimmock).

*Cocoons.*—Yellowish-white; solitary.

Represented in the United States National Museum by the Ashmead and Viereck types; also by one specimen from Washington, District of Columbia, C. L. Marlatt, collector, host not given; and by a large series of specimens from Knoxville, Tennessee, reared from *Pleuroprucha insulsaria* Guenée by W. B. Cartwright, of the Bureau of Entomology.

A careful study of the type material has convinced the writer that *winkleyi* Viereck is identical with *nemoriac* Ashmead.

## 104. APANTELES RUFOCOXALIS Riley.

*Apanteles congregatus*, var. *rufocoxalis* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 310.

*Apanteles rufocoxalis* Riley, QUAINANCE, U. S. Dept. Agr., Bur. Ent. Circ. 98, 1908, p. 5.

*Apanteles (Protapanteles) rufocoxalis* Riley, VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 187 and 194.

*Habitat*.—Missouri; Tennessee; Texas; Virginia; New York; Nova Scotia.

*Hosts*.—*Cirphis unipuncta* Haworth (Riley); *Nephelodes emedonia* form *violans* Guenée; (?) *Malacosoma americana* Fitch (Quaintance).

*Cocoons*.—Gregarious, completely embedded in a fluffy ball of pale buff silk.

This species is widely different from *congregatus*, and certainly can not be considered a variety of that species.

In addition to the type series the National Collection contains the following material: Five specimens from Nashville, Tennessee, reared by G. G. Ainslie, under Nashville No. 15205; 6 specimens from Truro, Nova Scotia, collected August 30, 1914, without further data; 4 specimens from Brownsville, Texas, reared by R. A. Vickery, under Webster Nos. 6451 and 6453; 21 specimens from central Missouri, without further data; 2 specimens from Falls Church, Virginia, collected by Nathan Banks; 1 specimen from Batavia, New York, reared by H. H. Knight from the army worm.

## 105. APANTELES SCITULUS Riley.

*Apanteles congregatus*, var. *scitulus* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 310.

*Apanteles emarginatus* RILEY, in Scudder Butterflies of U. S., 1889, p. 1906.

*Apanteles (Protapanteles) scitulus* Riley, VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, p. 193.

*Apanteles parorgyiae* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 161.

*Apanteles (Cryptapanteles) rilcyanus* VIERECK = (*A. emarginatus* Riley preoccupied), Proc. Ent. Soc. Wash., vol. 11, 1910, p. 210.

*Habitat*.—Missouri; New Hampshire; Nebraska; Maryland; Tennessee; New Jersey; Kansas; Florida. Evidently this species is generally distributed at least over the eastern half of the United States.

*Hosts*.—*Diacrisia virginica* Fabricius (Riley, Ashmead); *Olene* (?) *clintoni* Grote and Robinson (Ashmead); *Acronycta obliquata* Smith and Abbot; *Acronycta brumosa* Guenée.<sup>1</sup>

*Cocoons*.—Gregarious, completely embedded in a mass of whitish silk.

<sup>1</sup> Ins. Life, vol. 3, p. 15.

As the result of a most careful study of the types of the species listed in the synonymy the writer is of the opinion that they are representatives of *scitulus*.

Besides the types of this species and those of the two species placed in synonymy, the National Collection contains specimens as follows: Three specimens from Lincoln, Nebraska, reared by L. Bruner from *Acronycta obliquata*; a large series from Prince Georges County, Maryland, collected by A. B. Gahan; 4 specimens from Knoxville, Tennessee, collected by G. N. Bentley; 11 specimens from Brunswick, New Jersey, collector not indicated; 14 specimens bearing Bureau of Entomology No. 360a, reared December 7, 1886, from *Acronycta obliquata*, locality not indicated; 1 specimen from Lawrence, Kansas, collected by Hugo Kahl; and a large series from Paradise Keys, Florida, collected by Barber and Schwarz.

106. APANTELES XYLINUS (Say).

*Microgaster xylinus* SAY, Boston Journ. Nat. Hist., vol. 1, pt. 3, 1836, p. 262.

*Apanteles xylinus* Say, PROVANCHER, Addit. faun. Canada, Hymenop., 1888, p. 388.

*Apanteles (Protapanteles) cushmani* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 144.

*Apanteles (Protapanteles) oxyacanthoidis* VIERECK, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 581.

*Apanteles (Protapanteles) lanificus* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 188, 196.

*Habitat*.—Very generally distributed over the eastern half of the United States and southern Canada, and occurring as far west as Colorado. Very common.

*Host*.—*Agrotis c-nigrum* Linnaeus; "cutworms."

*Cocoons*.—Gregarious, enclosed in a compact ball of whitish silk.

A careful study of the type material has convinced the writer that the species listed in the synonymy are *xylinus* Say.

The National Collection contains, in addition to the type series and the type material of the listed synonyms, numerous series of this species from widely distributed localities. Several of these series are recorded as having been reared from *Agrotis c-nigrum*; others are labeled as having been reared from cutworms, but so far as known *A. c-nigrum* is the only identified host. One lot of specimens bred from *A. c-nigrum* bears Bureau of Entomology No. 2486°, but is without locality or collector labels. Another series from the same host was reared by H. Severin at Racine, Wisconsin. The writer has also seen material of this species in the collections of the Iowa, Illinois, Kansas Agricultural Experiment Stations, in the collection of the Gypsy Moth Laboratory, at Melrose Highlands, Massachusetts, and in that of Cornell University.

## 107. APANTELES YAKUTATENSIS Ashmead.

*Apanteles yakutatensis* ASHMEAD, Proc. Wash. Acad. Sci., vol. 4, 1902, p. 249.

*Apanteles (Protapanteles) hyslopi* VIERECK, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 379.

*Habitat*.—Alaska; Washington; Utah.

*Hosts*.—*Autographa gamma*, var. *californica* Speyer (Viereck); *Agrotis c-nigrum* Linnaeus.

*Cocoons*.—Gregarious, enclosed in a firm mass of whitish silk.

The types of *yakutatensis* and *hyslopi* have been compared, and the writer is of the opinion that they represent the same species. It is quite possible that *yakutatensis* is but a geographical form of *xylinus*, which it resembles structurally and biologically, differing only in its darker coloring.

Besides the types of this species and those of its synonym, the National Collection contains the following material: Six specimens from Forest Grove, Oregon, reared by L. P. Rockwood from *Agrotis c-nigrum* under Webster No. 18456; five specimens, under Quaintance No. 15454, from Seaview, Washington, collected by H. K. Plank, are without host record; another small series from Grayland, Washington, is without host or collector's labels. The writer has also seen a series from Utah.

## 108. APANTELES CRAMBI Weed.

*Apanteles crambi* WEED, Bull. Ill. State Labor. Nat. Hist., vol. 3, 1887, p. 8.

*Habitat*.—Illinois; Ohio; Maryland; Tennessee; South Dakota.

*Hosts*.—*Crambus trisectus* Walker; *C. mutabilis* Clemens; *C. zeellus* Fernald (Weed).

*Cocoons*.—White; gregarious, in cocoon of host.

This species is represented in the National Collection by 1 specimen from Champaign, Illinois, reared from *Crambus trisectus*; 6 specimens from Wooster, Ohio, labeled as parasitic on the corn web-worm, reared by F. M. Webster, July 7, 1885; 1 specimen from Maryland without further data; a series of 15 specimens from Nashville, Tennessee, reared from *Crambus mutabilis* by G. G. Ainslie, under Webster No. 12358; and a series from Elk Point, South Dakota, reared from *Crambus mutabilis*.

## 109. APANTELES PLATHYPENAE, new species.

Very similar to *laeviceps*, from which it differs in the venter of the abdomen being usually entirely yellowish, in the disk of the scutellum being weakly punctate, and in the much larger stigma.

*Female*.—Length, 2.2 mm. Head with the vertex, temples, and cheeks smooth and very strongly shining; antennae almost or quite as long as the body; mesoscutum with numerous distinct sharp punctures, more scattered at the sides and posteriorly; disk of scutellum



slightly convex, indistinctly punctate and shining; mesopleura closely punctate anteriorly, highly polished posteriorly; propodeum rugoso-reticulate, with a median longitudinal carina; posterior coxae closely punctate and strongly pubescent, yet somewhat shining; spurs of posterior tibiae apparently equal in length and not distinctly half as long as the metatarsus; forewing with the stigma very large, at least half as long as the distance from its base to the base of the wing, and distinctly a little longer than the metacarpus; the inner side of the stigma almost twice as long as the outer; abdomen oval; the first tergite broadening gradually from base to apex, and together with the rectangular second tergite entirely rugose; suturiform articulation, rather broad and roughened; third and following tergites smooth and polished, except that rarely there are a few weak striulae at the extreme base of the third plate in the middle; ovipositor subexserted. Black; antennae and tegulae blackish; wings hyaline, the stigma and veins very pale brown, the stigma almost transparent; legs yellowish, except all coxae, which are black, the extreme apex of posterior femora and of posterior tibiae, and most of the posterior tarsi, which are dusky; abdomen black, with more or less testaceous laterally on the third tergite, and with the third and following dorsal segments giving off strong bluish reflections; venter of the abdomen entirely yellowish.

*Male*.—Essentially as in the female.

*Type locality*.—Wellington, Kansas.

*Type*.—Cat. No. 22538, U.S.N.M.

*Host*.—*Plathypena scabra* Fabricius.

Described from two females and one male bred by T. H. Parks in the Bureau of Entomology, under Webster No. 5471.

#### 110. APANTELES AUTOGRAPHAE, new species.

Very close to *plathypenae*, but differs in the smaller and darker stigma, in the stigma being a little shorter than the metacarpus, and in the posterior coxae being very coarsely granular, rather than closely punctate, on the outer face.

*Female*.—Length, 2.2 mm. Head indistinctly punctate and strongly shining; temples rather broad; mesoscutum closely punctate medially, almost impunctate posteriorly and at the sides; disk of the scutellum slightly convex, indistinctly punctate and strongly shining; mesopleura polished, except below and anteriorly, where they are uniformly punctate; propodeum coarsely roughened, and with a distinct median longitudinal carina; stigma normal, not longer than metacarpus, and not distinctly half the length of the distance from its base to the base of wing; posterior coxae very coarsely granular and dull on the outer face; inner spur of posterior tibiae not longer than the outer, and not longer than half the metatarsus; abdomen elongate-

oval; the first tergite broadening gradually posteriorly, and, like the almost rectangular second tergite, coarsely rough; third and following tergites smooth and shining; ovipositor subexserted. Black; antennae and tegulae black; wings hyaline, the stigma and veins dark brown; all coxae black; remainder of legs entirely yellow, the posterior femora not at all fuscous at apex; third abdominal tergite usually testaceous laterally; venter of the abdomen entirely testaceous.

*Type locality*.—Baton Rouge, Louisiana.

*Type*.—Cat. No. 22539, U.S.N.M.

*Host*.—*Autographa brassicae* Riley.

Described from three female specimens bred by C. E. Smith, of the Bureau of Entomology, under Chittenden No. 4177-1.

#### 111. APANTELES GRIFFINI (Viereck).

*Apanteles (Protapanteles) griffini* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 177.

*Habitat*.—Widely distributed over the eastern half of the United States and occurring as far west as Kansas.

*Host*.—*Feltia gladiaria* Morrison; "cutworms"; apparently a general parasite of cutworms.

*Cocoons*.—Dirty whitish to pale buff; gregarious, heaped together, but not inclosed in a ball of silk.

Very closely related to *laeviceps*, and possibly only a geographical form of that species; the body is short-ovate. The posterior coxae are usually not so granular as in *laeviceps*; and the female antennae have the basal flagellar segments pale.

This species is represented in the National Collection by many series of specimens, in addition to the type material. The only identified host recorded among this great mass of material is *Feltia gladiaria*, from which the species was reared at Clarksville, Tennessee, by G. A. Runner.

#### 112. APANTELES LAEVICEPS Ashmead.

*Apanteles laeviceps* ASHMEAD, Bull. Colorado Biol. Assoc., No. 1, 1890, p. 17.—WEBSTER, Journ. Econ. Ent., vol. 4, 1911, p. 181.

*Habitat*.—General over the United States and lower Canada; apparently restricted, however, to the higher elevations.

*Hosts*.—*Cirphis unipuncta* Haworth; *Autographa brassicae* Riley; *Autographa*, species; *Scotogramma*, species; *Eurymus eurytheme* Boisduval; *Chorizagrotis agrestis* Grote; *C. auxiliaris* Grote; *Laphygma exigua* Hübner; *Neleucania albilinea* Hübner (Webster).

*Cocoons*.—Dirty whitish to pale buff; gregarious and heaped together irregularly; inseparable from those of *griffini*.

Besides the type series the National Collection contains a vast amount of material of this species, among which are the following

interesting records: Maxwell, New Mexico, reared from *Chorizagrotis agrestis* by D. J. Caffrey, under Webster No. 11131; Salt Lake, Utah, reared by L. P. Rockwood from *Autographa*, species, under Webster No. 7489; Murray, Utah, reared from *Scotogramma*, species, by L. P. Rockwood, under Webster No. 10320; Maxwell, New Mexico, reared from *Eurymus eurytheme* by D. J. Caffrey, under Webster No. 11202; Maxwell, New Mexico, reared from *Cirphis unipuncta* by C. K. Wildermuth, under Webster No. 11154; Rocky Ford, Colorado, reared from *Laphygma exigua* by H. O. Marsh, under Chittenden No. 1562; a large series from the army worm, *Cirphis unipuncta*, reared by Dr. James Fletcher at Ottawa, Canada; and a large series reared from cocoons taken on *Carex* on Mount Washington, New Hampshire.

### 113. APANTELES ROBINIAE (Fitch).

*Microgaster robiniae* FITCH, Fifth Ann. Rep. on Noxious, Beneficial, and Other Insects of the State of New York, 1859, p. 836.

*Apanteles (Protapanteles) robiniae* Fitch, VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, p. 196.

*Habitat*.—New York.

*Host*.—*Recurvaria robiniella* Fitch (Fitch).

*Cocoons*.—"White, solitary, within the mine of the host." (Fitch.)

Known only from the type material in the National Collection.

### 114. APANTELES ORNIGIS Weed.

*Apanteles ornigis* WEED, Bull. Ill. State Labor. Nat. Hist., vol. 3, 1887, p. 6.

*Apanteles tortricis* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 163.

*Apanteles (Apanteles) braunae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 614.

*Apanteles (Apanteles) lithocolletidis* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 615.

*Habitat*.—Illinois; New Hampshire; Minnesota; Massachusetts; Pennsylvania; New York; Virginia; District of Columbia; Kentucky; Missouri.

*Hosts*.—*Ornia geminatella* Packard (Weed); *Lithocolletis mariaella* Chambers; *Lithocolletis*, species (Viereck); *Lithocolletis propinquinella* Braun; *Tischeria*, species.

*Cocoons*.—Smooth, white, with a darker transverse median band, the cocoon being much thinner here than at the ends; solitary.

After a careful study of the type material under the names listed above, the writer is of the opinion that the four names have been applied to a single variable species.

Besides the types of *ornigis* and of its three synonyms the National Collection contains the following material: Several specimens from North East, Pennsylvania, reared from *Ornia geminatella* by D. Isely under Quaintance No. 10972; specimens from Washington, District of Columbia, reared from *Lithocolletis propinquinella* by C. R.

Ely; specimens from Falls Church, Virginia, reared by C. Heinrich from *Tischeria*, species in oak, under Hopk. U. S. No. 12100e; specimens from Lexington, Kentucky, reared from a leaf-miner in *Aesculus*, collector not indicated; and specimens from Kirkwood, Missouri, reared from *Lithocolletis mariaella* by Miss M. E. Murtfeldt.

115. APANTELES BEDELLIAE (Viereck).

*Apanteles* (*Protapanteles*) *bedelliae* VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 174.

*Habitat*.—District of Columbia; Louisiana; Virginia; New York; Arizona.

*Hosts*.—*Bedellia minor* Busck; *B. somnulentella* Zeller; *Proleucoptera albella* Chambers; *Recurvaria thujacella* Kearfott; *Anomis erosa* Hübner.

*Cocoons*.—White, small, gregarious, loosely grouped together.

The National Collection contains, in addition to the types, specimens reared from *Bedellia minor* at Baton Rouge, Louisiana, by C. E. Smith, under Chittenden No. 4030; specimens from Westbury, Long Island, reared by C. Heinrich from *Recurvaria thujacella* under Hopk. U. S. No. 12188b<sup>1</sup>; specimens from Washington, District of Columbia, reared from *Anomis erosa* by H. M. Russell; specimens from Tempe, Arizona, reared from *Proleucoptera albella* by D. J. Caffrey; specimens from Vienna, Virginia, reared from a leaf-miner of morning-glory, *Ipomaea*, by R. A. Cushman; specimens labeled "parasite on miner in *Convolvulus*," without further data; and a series under Bureau of Entomology No. 2518<sup>o</sup>, labeled as having been reared from *Bedellia somnulentella*, the locality and collector not given.

116. APANTELES ROHWERI, new name.

*Apanteles nigripes* ROHWER, Proc. Ent. Soc. Wash., vol. 15, 1913, p. 187 (not *nigripes* Ratzeburg, Ichn. d. Forstins., vol. 1, 1844, p. 71).

*Habitat*.—Virginia.

*Host*.—(*Gracilaria*) *Acrocercops strigifinitella* Clemens.

Besides the type of this species the National Collection contains two specimens reared by C. Heinrich, at the same place and from the same host as the type.

117. APANTELES EMPRETIÆ (Viereck).

*Apanteles* (*Protapanteles*) *empretiae* VIERECK, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 562.

*Apanteles* (*Apanteles*) *sibinidis* ROHWER, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 227.

*Apanteles empretiae* Viereck (= *Apanteles sibinidis* Rohwer) GAHAN, Proc. U. S. Nat. Mus., vol. 55, 1919, p. 121.

*Habitat*.—District of Columbia; Virginia; Florida; New Jersey.

*Hosts*.—*Sibine stimulea* Clemens (Viereck; Rohwer); *Parasa chloris* Herrich-Schaeffer.

*Cocoons*.—Buff in color; gregarious, without loose silk, and attached vertically to the body of the host.

There are in the United States National Museum, besides the types of *empretiae* and its synonym, specimens from Falls Church, Virginia, reared by C. Heinrich from *Parasa chloris* on chestnut, under Hopk. U. S. No. 11197<sup>b</sup>; also specimens from Miami, Florida, reared by Max Kisliuk from an unidentified caterpillar under Hunter No. 9035.

#### 118. APANTELES DIACRISIAE Gahan.

*Apanteles diacrisiae* GAHAN, Proc. U. S. Nat. Mus., vol. 53, 1917, p. 198.

*Habitat*.—Apparently widely distributed over the eastern half of the United States.

*Hosts*.—*Diacrisia virginica* Fabricius (Gahan); *Hemerocampa leucostigma* Smith and Abbot; *Hyphantria textor* Harris; *Olene clintoni* Grote.

*Cocoons*.—Gregarious, entirely inclosed in a mass of tough white silk.

In addition to the type series the National Collection contains a large amount of material of this species, reared from *Diacrisia virginica*, in widely different localities; also two specimens from Washington, District of Columbia, said to have been reared from *Hemerocampa leucostigma* by W. H. White, under Chittenden No. 908; another series bearing Bureau of Entomology No. 382L, said to have been reared from *Olene clintoni*; and a series from Columbia, South Carolina, reared from *Hyphantria textor* under Bureau of Entomology No. 484L<sup>o</sup>.

#### 119. APANTELES DEPRESSUS (Viereck).

*Apanteles (Stenopleura) depressus* VIIEECK, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 582.

*Habitat*.—Indiana.

*Host*.—Tortricid larva (Viereck).

Represented in the National collection by the type series only.

#### 120. APANTELES PYRALIDIS, new species.

*Female*.—Length, 2.2 mm. Face broader than long, punctate; antennae shorter than the body, apical segments very short; vertex and temples indistinctly punctate and shining; mesoscutum rather closely punctate and opaque, except along the posterior margin; scutellum with the disk practically impunctate, very shining, and the lateral face mostly roughened, the posterior polished area on the lateral face of scutellum being very small, semicircular in outline; mesopleura polished except anteriorly; propodeum entirely rugose and opaque, without a median carina; radius as long as, or a little longer than, the transverse cubitus, the two veins uniting in a strong angle; posterior coxae smooth and shining; abdomen moderately broad and hardly as long as the thorax; first tergite about as broad at apex as at base,

the sides bulging slightly, hardly one and one-half times as long as broad at apex, uniformly rugose; second tergite trapezoidal, as broad at base as first tergite is broad at apex, and broader at apex than at base, like the first tergite uniformly rugose and opaque; remainder of the abdomen smooth and shining, except for very slight roughening at the base of the third tergite; lateral membranous margins along the apical half of the first tergite and the entire length of the second rather broad; ovipositor subexserted. Black; antennae blackish, except the scape, which is somewhat pale beneath; tegulae black; legs entirely testaceous, except the base of all coxae, and the apex of the posterior femora and tibiae, and most of the posterior tarsi, which are dusky; lateral membranous margins on the two basal abdominal tergites, also the venter of the abdomen on the basal half, testaceous; wings hyaline, with the stigma and veins pale brown.

*Male*.—As in the female, except that the antennae are considerably longer than the body, and the coxae are usually more blackish.

*Cocoons*.—Small, white, gregarious, but not inclosed in a mass of silk.

*Type locality*.—Prince Georges County, Maryland.

*Type*.—Cat. No. 22540, U.S.N.M.

Described from many specimens of both sexes parasitic on various species of Pyralidae; specimens in the United States National Museum are recorded from *Nomophila noctuella* Denis and Schiffermueller; *Pyrausta futilalis* Lederer; and *Loxostege similalis* Guenée.

#### 121. APANTELES PALEACRITAE Riley.

*Apanteles paleacritae* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 313.

*Protapanteles ephyrae* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 163.

*Habitat*.—Illinois; Canada; New Hampshire; Massachusetts.

*Hosts*.—(*Paleacrita*) *Nyctobia anguilineata* Grote and Robinson (Riley); *Cosymbia lumenaria* Huebner (Ashmead); *Alsophila pometaria* Harris.

A careful study of the types of *paleacritae* and *ephyrae* shows beyond question that they are identical.

Besides the type material the National Collection contains one specimen from Bentonville, Arkansas, reared by D. Isely under Quaintance No. 16355, said to have been parasitic on the canker worm.

#### 122. APANTELES EUCHAETIS Ashmead.

*Apanteles euchaetis* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 159.

*Habitat*.—New Hampshire; Massachusetts; Illinois; Virginia.

*Host*.—*Euchaetias egle* Drury (Ashmead).

*Cocoons*.—White, gregarious, packed inside the cocoon of the host.

In addition to the type series the National collection contains one specimen of this species labeled as having been bred from *Euchaetias*

*egle* by S. A. Forbes; and eight specimens bearing Bureau of Entomology No. 171°, February 12, 1884, without further data. The writer has also seen several series of this species in the collection of the Gipsy Moth Laboratory, at Melrose Highlands, Massachusetts, which were reared from *Euchaetias egle* at Melrose Highlands.

## 123. APANTELES HALLII (Packard).

*Microgaster hallii* PACKARD, Amer. Natural., vol. 11, 1877, p. 52.

*Apanteles hallii* PACKARD, WEED, Trans. Amer. Ent. Soc., vol. 15, 1888, p. 295.

*Habitat*.—Polaris Bay.

*Host*.—Unknown.

Known only from the type series in the United States National Museum.

## 124. APANTELES ATALANTAE (Packard).

*Microgaster* (? *Apanteles*) *atalantae* PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, 1881, p. 27.

*Apanteles congregatus*, var. *atalantae* Packard, RILEY, Amer. Natural., vol. 16, 1882, p. 679.

*Apanteles atalantae* Packard, RILEY, in Scudder, Butterflies U. S., 1889, p. 1908.

*Habitat*.—Massachusetts; New Jersey; Michigan; Canada; apparently generally distributed over the Northeastern States.

*Hosts*.—*Vanessa atalanta* Linnaeus (Packard); *Aglais milberti* Godart (Riley).

*Cocoons*.—Gregarious, imbedded in small masses of pure white silk.

The National Collection contains, in addition to the large type series, a specimen of this species from Ottawa, Canada, reared by T. W. Fyles from *Aglais milberti*; and specimens from Agricultural College, Michigan, without further data. The writer has also seen many series of this species, reared from the above-named hosts, in the collection of the Gipsy Moth Laboratory at Melrose Highlands, Massachusetts.

## 125. APANTELES THECLAE Riley.

*Apanteles theclae* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 308; in Scudder, Butterflies U. S., 1889, p. 1906.

*Apanteles glomeratus*, var. *theclae* Riley, PATTON, Psyche, vol. 6, 1892, p. 261.

*Parapanteles theclae* Riley, ASHMEAD, Proc. U. S. Nat. Mus., 1900, vol. 23, p. 131.

*Habitat*.—Georgia; Alabama; Texas; Kansas; Oklahoma; Missouri.

*Hosts*.—*Thecla*, species (Riley); (*Uranotes*) *Strymon melinus* Hübner; (*Lycaena*) *Everes comyntas* Godart.

*Cocoons*.—White; gregarious, loosely grouped together.

Besides a large type series there is in the National Collection the following material: A series from Dallas, Texas, reared by W. D. Pierce from (*Uranotes*) *Strymon melinus* on cotton; a series from

Wellington, Kansas, reared by T. S. Wilson under Webster No. 12442; a small series from Sweetwater, Oklahoma, reared by H. Hines from *Strymon melinus*; and two specimens sent in from Missouri by W. H. Edwards labeled as probably parasitic on (*Lycaena*) *Everes comyntas*.

126. APANTELES ELECTRAE (Viereck).

*Apanteles (Protapanteles) electrae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 145.

*Habitat*.—California; Arizona; New Mexico.

*Hosts*.—*Hemileuca electra* Wright (Viereck); *Hemileuca nevadensis* Stretch; *Pseudohazis hera* Harris; *P. eglanterina* Boisduval; *Agapema galbina* Clemens.

*Cocoons*.—White; gregarious, attached separately to the back of the host, and not surrounded by loose silk.

Very close to *hemileuca*, from which it differs only in the darker tegulae and legs.

Represented in the United States National Museum by the types and the following additional material: Twelve specimens reared from *Hemileuca nevadensis*, at Maxwell, New Mexico, by D. J. Caffrey; five specimens bred from *Pseudohazis eglanterina* at Santa Rosa, California; a small series bearing Bureau of Entomology No. 359°, from San Bernardino, California, reared from *Pseudohazis hera*; a series from Los Angeles, California, reared, under Bureau of Entomology No. 532, from *Hemileuca*, species; a series under Bureau of Entomology No. 391, from Arizona, bred from *Agapema galbina* Clemens; and several additional specimens from California and New Mexico.

127. APANTELES MELANOSCELUS (Ratzeburg).

*Microgaster melanoscelus* RATZEBURG, Ichn. d. Forstins., vol. 1, 1844, p. 74.

(*Microgaster melanoscelus* Ratzeburg) = *Apanteles difficilis* Nees, MARSHALL, Trans. Ent. Soc. London, 1885, p. 187.

*Habitat*.—Europe; and New England, over the gipsy-moth area.

*Host*.—*Porthetria dispar* Linnaeus.

*Cocoons*.—Yellowish-green; solitary.

This species, introduced from Europe as an enemy of the gipsy moth, and successfully established in the gipsy-moth area in New England, is very close to *solitarius*, which it resembles biologically as well as structurally; possibly it is not more than a variety of that species, differing only in the blackish posterior femora, and in the third abdominal tergite being somewhat less roughened. There can be no question that Marshall erred in placing *melanoscelus* in the synonymy of *difficilis*.

Represented in the United States National Museum by several specimens bred from the gipsy moth in Europe, and by several others



reared from the same host in Massachusetts. The writer has also had the opportunity of studying a vast amount of material of this species at the Gipsy Moth Laboratory, at Melrose Highlands, Massachusetts.

128. APANTELES FLAVICONCHAE Riley.

*Apanteles limenitidis* form *flaviconchae* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 308.

*Apanteles (Protapanteles) flaviconchae* Riley, VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, p. 193.

*Habitat*.—Missouri; Connecticut; Massachusetts; Maine; Maryland; West Virginia; apparently very widely distributed at least over the eastern half of the United States.

*Hosts*.—*Cirphis unipuncta* Haworth (Riley); *Eurymus philodice* Godart; *Anthocharis genutia* Fabricius; *Plathypena scabra* Fabricius.

*Cocoons*.—Bright yellow; gregarious and loosely heaped together.

The National Collection contains, besides the types, many series from widely distributed localities, but giving few host records. One series from Branford, Connecticut, is said to have been taken with the army worm (presumably *Cirphis unipuncta*); another series from Agawam, Massachusetts, reared by H. E. Smith, is said to be from *Eurymus*, species. Two specimens from Orono, Maine, are labeled as reared from *Eurymus philodice*; another lot of specimens from Hagerstown, Maryland, are recorded from the same host by W. E. Pennington. One specimen from Coalburgh, West Virginia, is said to have been reared from *Anthocharis genutia*. The writer has also seen a series reared by F. H. Chittenden, at College Park, Maryland, from *Plathypena scabra*.

129. APANTELES KOEBELEI Riley.

*Apanteles koebelei* RILEY, in Scudder, Butterflies U. S., 1889, p. 1904.

*Habitat*.—California.

*Host*.—*Euphydryas editha* Boisduval (Riley).

Known only from the type series in the United States National Museum.

130. APANTELES ANISOTAE, new species.

*Female*.—Length, 2 mm. Face much broader than long, punctate and rather opaque; vertex indistinctly punctate and shining; mesoscutum rather strongly punctate, more closely so where the parapsidal furrows would be if present, somewhat opaque; scutellum with the disk slightly convex, weakly punctate, and strongly shining, and the lateral face with the posterior polished area semicircular, and occupying much less than half of the entire area of the lateral face; mesopleura highly polished, with a deep, inconspicuously roughened depression near the apex; propodeum uniformly rugulose and shining, with a distinct median longitudinal carina; metacarpus about

as long as the stigma, the radius slightly longer than the transverse cubitus, and uniting with it in a strong angle; nervellus directed strongly toward base of wing; posterior coxae mostly smooth and shining with a conspicuous, punctate, oval, flattened area on the outer edge at base; inner spur of posterior tibiae somewhat longer than the outer, and more than half the length of the metatarsus; abdomen rather short, ovate; the first tergite broadening gradually from the base to the apex, smooth and highly polished on the basal half, punctate and opaque on the apical half; second tergite trapezoidal, more than twice as broad as long, the sides oblique on the basal half, parallel on the apical half, posterior margin practically straight, the tergite very finely, indistinctly rugulose and opaque; remainder of the abdomen perfectly smooth and very highly polished; ovipositor subexserted. Black; antennae entirely, tegulae, all coxae, basal trochanters, and the posterior femora, and entire abdomen, black; base of middle femora, apex of posterior tibiae and the posterior tarsi, dusky; wings hyaline, stigma and veins brown.

*Cocoons*.—Deep buff in color; gregarious, but not inclosed in a ball of silk, and with almost no loose silk about each one.

*Type locality*.—Falls Church, Virginia.

*Type*.—Cat. No. 22541, U.S.N.M.

*Host*.—*Anisota senatoria* Smith and Abbot.

Described from two female specimens bred by Miss Ada Kneale, in the Bureau of Entomology, under Quaintance No. 14501.

#### 131. APANTELES NITENS, new species.

In structure practically identical with *griffini*; differs from that species, however, in the black legs and the entirely black and somewhat longer antennae.

*Female*.—Length 2 mm. Head weakly punctate, shining; face with a rather distinct median ridge below antennae; mesoscutum distinctly but not closely punctate; scutellum with the disk entirely impunctate and very highly polished, the lateral face mostly smooth and shining; mesopleura somewhat punctate anteriorly and below, polished behind; propodeum coarsely rugose, with a rather distinct median longitudinal carina; inner side of the stigma almost or quite twice as long as the outer; metacarpus not longer than stigma; radius shorter, or at least no longer, than the transverse cubitus; posterior coxae slightly granular above, smooth and shining on the outer face; posterior femora slender; spurs of posterior tibiae about equal in length and a little less than half the length of the metatarsus; abdomen rather short-oval; the first abdominal tergite much broader at

apex than at base; the second broad, rectangular, with the posterior margin slightly curved forward at the sides; first and second tergites rugulose, though shining; the remainder of the abdomen perfectly smooth and highly polished; ovipositor subexserted. Black; antennae, tegulae, all coxae, and trochanters, basal half of fore femora, middle and hind femora entirely, black; tibiae largely testaceous, the posterior pair blackish on the apical third; tarsi dusky; wings very slightly infumated, the stigma and veins brown.

*Male*.—Differs in no essential character from the female.

*Type locality*.—Forest Grove, Oregon.

*Type*.—Cat. No. 22553, U.S.N.M.

*Host*.—*Feltia aeneipennis* Grote.

Described from six female and two male specimens bred by L. P. Rockwood, October 18, 1916, in the Bureau of Entomology, under Webster No. 18448.

#### 132. APANTELES CARDUICOLA (Packard).

*Microgaster* (*Apanteles* ?) *carduicola* PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, 1881, p. 27.

*Apanteles carduicola* Packard, WEED, Trans. Amer. Ent. Soc., vol. 15, 1888, p. 296.—RILEY, in Scudder, Butterflies U. S., 1889, p. 1907; SCUDDER, Butterflies U. S., 1889, p. 469.

*Habitat*.—United States; Nipigon Forest Reserve, Canada.

*Hosts*.—*Vanessa cardui* Linnaeus (Packard); *V. virginiensis* Drury (Scudder).

Known only from the type series in the United States National Museum.

#### 133. APANTELES HESPERIDIVORUS (Viereck).

*Apanteles* (*Protapanteles*) *hesperidivorus* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 626.

*Habitat*.—Connecticut.

*Host*.—Hesperid on oak (Viereck).

Known only from the type series in the United States National Museum.

#### 134. APANTELES CYANIRIDIS RILEY.

*Apanteles cyaniridis* RILEY, in Scudder, Butterflies U. S., 1889, p. 1903.

*Habitat*.—United States.

*Host*.—*Lycaenopsis pseudargiolus* Boisduval and LeConte.

*Cocoon*.—White, with a tinge of lemon-yellow; solitary.

A stout species, with an exceptionally broad abdomen.

Known only from the type series in the United States National Museum.

## 135. APANTELES ACAUDUS (Provancher).

*Microgaster acaudus* PROVANCHER, Addit. faun. Canad. Hymenop., 1886, pp. 139, 142.

*Apanteles acaudus* PROVANCHER, Addit. faun. Canad. Hymenop., 1888, p. 388.

*Habitat*.—Canada.

*Host*.—Unknown.

Very distinct, in possessing especially long spurs on posterior tibiae, the inner spur being about three-fourths the length of the metatarsus.

The writer has seen only a single specimen of this species. This specimen, which is in the United States National Museum, was compared with the type, which is in the Museum of Public Instruction at Quebec, by A. B. Gahan and made a homotype. It is without locality or host labels.

## 136. APANTELES ARGYNNIDIS Riley.

*Apanteles argynnidis* RILEY, in Scudder, Butterflies U. S., 1889, p. 1904.

*Habitat*.—West Virginia; District of Columbia; California.

*Host*.—*Argynnis cybele* Fabricius (Riley); *Argynnis*, species.

*Cocoons*.—Small, whitish, gregarious, not inclosed in a mass of silk.

Besides the type series the National Collection contains two specimens from Placer County, California, said to have been reared from an unidentified species of *Argynnis*.

## 137. APANTELES PRENIDIS, new species.

*Female*.—Length, 2.5 mm. Head strongly shining; face very minutely punctate; vertex and temples mostly polished; antennae almost as long as the body; mesoscutum with sharp separate punctures on the anterior two-thirds, practically impunctate and polished posteriorly; disk of scutellum very flat, entirely impunctate and highly polished; mesopleura distinctly punctate anteriorly, polished behind; propodeum coarsely rugoso-reticulate, with a very prominent median longitudinal carina, opaque; radius not, or indistinctly, longer than the transverse cubitus; posterior coxae smooth and strongly shining; inner spur of posterior tibiae slightly longer than the outer and about half as long as the metatarsus; abdomen broad-oval; first abdominal tergite broader at apex than at base, ruguloso-punctate; second tergite broad, almost rectangular, only indistinctly roughened, mostly smooth and shining; suturiform articulation foveolate laterally; third and following tergites smooth and polished; ovipositor sheaths hardly exerted. Black; antennae entirely brownish-black; tegulae black; legs testaceous, except all coxae.

which are black, and the extreme apex of the posterior femora, which is dusky; abdomen entirely black above and below.

*Type locality*.—Luguillo, Porto Rico.

*Type*.—Cat. No. 22549, U.S.N.M.

*Host*.—(*Prenes*) *Calpodes arca* Felder. Described from eight female specimens bred by T. H. Jones.

#### 138. APANTELES PODUNKORUM (Viereck).

*Apanteles* (*Stenopleura*) *podunkorum* VIERECK, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 583.

*Habitat*.—Connecticut; Virginia.

*Host*.—*Pyrausta futilalis* Lederer.

*Cocoons*.—White; gregarious, loosely heaped together.

Very close to *pyraustae*, and sometimes separated with difficulty; usually, however, the characters given in the foregoing table will suffice to distinguish the species.

The National Collection possesses, in addition to the type series, a lot of six specimens reared from *Pyrausta futilalis* at Vienna, Virginia, by R. A. Cushman.

#### 139. APANTELES PYRAUSTAE (Viereck).

*Apanteles* (*Protapanteles*) *pyraustae* VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 626.

*Habitat*.—Connecticut.

*Host*.—*Pyrausta futilalis* Lederer (Viereck).

*Cocoons*.—White; gregarious, but not inclosed in a ball of silk. Known only from the type series in the United States National Museum.

#### 140. APANTELES PHOBETRI (Rohwer).

*Apanteles* (*Protapanteles*) *phobetri* ROHWER, Proc. U. S. Nat. Mus., vol. 49, 1915, p. 228.

*Habitat*.—Virginia; Massachusetts; Kentucky; Kansas; Indiana.

*Hosts*.—*Phobetron pithecium* Smith and Abbot (Rohwer); *Halisidota tessellaris* Smith and Abbot.

*Cocoons*.—Pale buff; gregarious, but formed separately on the back of the host caterpillar, and not surrounded by loose silk.

The National Collection contains, in addition to the type series, three specimens of this species reared at Lexington, Kentucky, from *Halisidota tessellaris* by H. Garman, and bearing Accession No. 2603 of the Kentucky Agricultural Experiment Station; one specimen, without locality label, said to have been reared from *H. tessellaris*; a series from *Halisidota* on sycamore at Wells, Kansas; and a series from Mount Vernon, Indiana, reared from an unknown lepidopterous larva by J. J. Davis.

## 141. APANTELES DELICATUS Howard.

*Apanteles delicatus* HOWARD, Bull. U. S. Dept. Agric., Bur. Ent., Tech. Ser., 5, 1897, p. 54.

*Habitat*.—District of Columbia; Connecticut.

*Host*.—*Hemerocampa leucostigma* Smith and Abbot.

*Cocoons*.—White; solitary.

Known only from the types in the United States National Museum.

## 142. APANTELES ALGONQUINORUM (Viereck).

*Apanteles (Protapanteles) algonquorum* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Surv., 1916, pp. 188, 196.

*Habitat*.—Connecticut.

*Host*.—Unknown.

Known only from the types in the United States National Museum.

## 143. APANTELES TMETOCERAE, new species.

*Female*.—Length, 3.3 mm. Face somewhat roughened medially, with a distinct sharp median ridge originating just below the insertion of the antennae and extending halfway to the clypeus; vertex somewhat punctate, rather shining; mesoscutum closely sharply punctate; scutellum with the disk convex, practically impunctate and very shining; suture at the base of the disk broad, with numerous conspicuous pits; mesopleura largely polished, with a shallow, non-crenulate depression posteriorly; propodeum rugose, with a rather distinct median longitudinal carina and with costulae; forewing with the stigma large, and with the radius strongly directed backward, very slightly longer than the transverse cubitus and uniting with the latter in a sharp angle; nervellus strongly curved toward base of wing; posterior coxae large, shining; inner spur of posterior tibiae but very slightly longer than the outer, and about half as long as the metatarsus; abdomen longer than the thorax, stout; the first tergite broadening gradually from base to apex, the apical angles rounded, the plate somewhat punctate or weakly roughened on the posterior half; second tergite subtrapezoidal, two-thirds as long as the first tergite is broad at apex, one and one-half times as broad at apex as long down the middle, and slightly broader at apex than at base, feebly rugulose and somewhat shining; remainder of the abdomen smooth and shining; ovipositor subexserted. Black; antennae entirely black; tegulae dark brown; wings hyaline, with the stigma and veins dark brown, even the subdiscoideus strongly pigmented all the way to the margin of the wing; all coxae black; remainder of the legs testaceous, except the extreme apex of the posterior femora above and most of the posterior tarsi, which are blackish; sides of the venter of the abdomen yellowish on the basal half.

*Male*.—Essentially as in the female.

*Type locality*.—Nova Scotia, Canada.

*Type*.—Cat. No. 22554, U.S.N.M.

*Host*.—*Tmetocera ocellana* Schiffermueller.

Described from one specimen of each sex bred by Mr. W. H. Brittain.

#### 144. APANTELES OROBENAE Forbes.

*Apanteles orobenae* FORBES, Rep. Noxious Insects Ill., vol. 12, 1882, p. 104.

*Apanteles congregatus*, var. *orobenae* Forbes, WEED, Bull. Ill. State Labor.

Nat. Hist., Vol. 3, 1887, p. 5.

*Habitat*.—Illinois; Louisiana; (?) Connecticut.

*Host*.—*Evergestis rimosalis* Guenée (Forbes).

This is without question a distinct species, and should not be regarded as a variety of *congregatus*, as suggested by Weed.

The National Collection contains two specimens received from S. A. Forbes, and which are undoubtedly paratypes; also a series from Baton Rouge, Louisiana, reared from *Evergestis rimosalis* by T. H. Jones under Chittenden No. 4199-1; and a series from Illinois, reared from the same host under Bureau of Entomology No. 2243°.

#### 145. APANTELES HYDRIAE, new species.

*Female*.—Length, 2.2 mm. Face weakly punctate, somewhat shining; vertex indistinctly punctate and shining; antennae distinctly shorter than the body; mesoscutum evenly but very shallowly punctate and shining, inconspicuously so posteriorly; scutellum with the disk very slightly convex, practically impunctate and strongly shining, and the lateral face with the posterior polished area rather semicircular and not quite as large as the roughened part in front; mesopleura exceedingly highly polished; propodeum indistinctly punctate and very shining at extreme base, finely rugulose behind, with a rather distinct median longitudinal carina; stigma broad; radius perpendicular to the anterior margin of the wing and much longer than the transverse cubitus; nervellus curving strongly behind toward base of wing; posterior coxae with a large oval, punctate, flattened area on the outer edge at base above; spurs of posterior tibiae apparently equal in length, and hardly half as long as the metatarsus; abdomen elongate-oval; the first tergite broadening gradually toward apex, smooth and polished at base, punctate on the posterior half; second tergite trapezoidal, broader at apex than at base, the sides rather oblique on the basal half and parallel on the apical half, the plate somewhat smooth and shining medially, rugulose at the sides; third and following tergites smooth and shining; hypopygium not projecting beyond apex

of last dorsal segment; ovipositor not exerted. Black; antennae entirely black; tegulae black; wings hyaline, the stigma dark brown; all coxae black; the remainder of the legs entirely testaceous; the narrow membranous margins along the sides of the two basal abdominal tergites fuscous; venter of the abdomen black.

*Male*.—Essentially as in the female, except that the second abdominal tergite is more smooth and shining.

*Cocoons*.—Small, dull white; gregarious, with practically no loose silk.

*Type locality*.—Falls Church, Virginia.

*Type*.—Cat. No. 22550, U.S.N.M.

*Host*.—(*Hydria*) *Calocalpe undulata* Linnaeus.

Described from three females and four males bred by Carl Heinrich in the Bureau of Entomology, under Hopkins U. S. No. 12136<sup>d</sup>-1.

#### 146. APANTELES GLOMERATUS (Linnaeus).

*Ichneumon glomeratus* LINNAEUS, Syst. nat., ed. 10, vol. 1, 1758, p. 568.

*Microgaster glomeratus* LINNAEUS, HALIDAY, Entom. Magaz., vol. 2, 1834, p. 262.

*Apanteles glomeratus* LINNAEUS, MARSHALL, Trans. Ent. Soc. London, 1885, p. 176.—SCUDDER, Butterflies U. S., 1889, p. 1204.—RILEY, in Scudder, Butterflies U. S., 1889, p. 1898.

*Microgaster (Apanteles?) pieridis* PACKARD, Proc. Boston Soc. Nat. Hist., vol. 21, 1881, p. 26.

*Microgaster congregatus*, var. *pieridivora* RILEY, Amer. Natural., vol. 16, 1882, p. 679.

*Habitat*.—Europe; United States; Canada.

*Hosts*.—*Pieris rapae* Linnaeus; *P. protodice* Boisduval and LeConte; (?) *Autographa brassicae* Riley; *Pieris oleracea* Harris (Scudder).

*Cocoons*.—Bright to dull yellow; gregarious, loosely heaped together.

The National Collection possesses a large amount of material of this species, including the types of *pieridis*, and one series from England, received from G. H. Bignell. The greater part of this material has been reared from *Pieris rapae*, but one series bred at Riverhead, Long Island, by H. M. Russell is said to be from *Autographa brassicae*; another series, reared by W. E. Pennington at Boonsboro, Maryland, is said to have come from *Cirphis unipuncta*, while the Bureau of Entomology notes record the species as having been reared by T. H. Jones, at Baton Rouge, Louisiana, from *Pieris protodice*.



## 147. APANTELES ACRONYCTAE Riley.

*Apanteles acronyctae* RILEY, 2d. Rep. Insects Missouri, 1870, p. 120; Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 312.—VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, p. 195.

*Apanteles orgyiae* ASHMEAD, Bull. Ohio Exper. Sta., vol. 1, 1893, p. 157.

*Habitat.*—Illinois, Missouri, Iowa, Connecticut, New Hampshire, Colorado, California, Ohio, New Jersey.

*Hosts.*—*Acronycta populi* Riley (Riley); *A. oblinita* Smith and Abbot (Viereck); *Merolonche lupini* Grote; *Acronycta* (?) *leporina* Linnaeus; (?) *Hemerocampa leucostigma* Smith and Abbot.

*Cocoons.*—Gregarious, entirely inclosed in a mass of white loose silk.

A careful study of the types of *acronyctae* and *orgyiae* proves them to be identical.

Besides the type specimens of this species and those of its synonym, the National Collection contains several series of this species. One lot of specimens from Placer County, California, bears Bureau of Entomology No. 49° and is said to have been reared from *Merolonche lupini*. A series from Canobie Lake, New Hampshire is labeled as having been reared from *Acronycta* (?) *vulpina*. Another series bearing Bureau of Entomology No. 4345, was reared from a bombycid on willow, at West Cliffe, Colorado.

## 148. APANTELES FLAVIVENTRIS (Cresson).

*Microgaster flaviventris* CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 66.

*Apanteles flaviventris* CRESSON, ASHMEAD, Trans. Ent. Soc. London, 1900, p. 277.

*Habitat.*—West Indies; Texas.

*Host.*—*Tetralopha subcanalis* Walker.

Types in the Academy of Sciences at Philadelphia and not seen by the writer. However, the National Collection contains a series of what is without doubt this species, reared at Cuero, Texas, from *Tetralopha subcanalis* by M. M. High.

## 149. APANTELES HYPHANTRIAE Riley.

*Apanteles hyphantriae* RILEY, Rep. Entom. U. S. Dep. Agric., 1886, p. 513.—

PACKARD, 5th Rep. U. S. Entom. Commiss., 1890, p. 254.—HOWARD, Bull. No. 5, U. S. Dept. Agric. Bur. Ent., tech. ser., 1897, p. 25.

*Habitat.*—British Columbia; Virginia; Maryland; Texas; Missouri; South Carolina; New Mexico; Connecticut; Massachusetts. Evidently this species is very widely distributed over the United States and Canada.

*Hosts*.—*Hyphantria cunea* Drury; *H. texor* Harris; *Hemerocampa leucostigma* Smith and Abbot (Howard).

*Cocoons*.—White; solitary.

Besides the types the National Collection contains specimens of this species reared from *Hyphantria cunea* at Vienna, Virginia, by R. A. Cushman; at College Park, Maryland, by A. B. Gahan; at Cuero, Texas, by M. M. High; and at Kirkwood, Missouri, by Miss M. E. Murtfeldt; also a series reared from *Hyphantria texor* at Holly Hill, South Carolina; two specimens bearing Bureau of Entomology No. 205-06; and several specimens from Mesilla, New Mexico, reared from an unidentified host.

#### 150. APANTELES CLISIOCAMPAE Ashmead.

*Apanteles clisiocampae* ASHMEAD, in Fiske, Bull. No. 6, N. H. Agric. Exp. Sta., tech. ser., 1903, p. 229.

*Habitat*.—New Hampshire; New York.

*Host*.—*Malacosoma americana* Fabricius.

This species is very close to *hyphantriae*, but is probably distinct; separable by the characters noted in the key.

Represented in the United States National Museum by the type and a single specimen reared from *Malacosoma americana* at Auburn, New York, by B. A. Porter.

#### 151. APANTELES EUPHYDRYIDIS, new species.

*Female*.—Length, 2.2 mm. Face closely coarsely punctate, very dull; vertex shagreened, somewhat shining; mesoscutum very closely coarsely punctate, rather dull; scutellum with the disk short and broad, convex, sparsely punctate, shining; the lateral face of scutellum with the polished area reduced to little more than a transverse line, the anterior sculptured area with strong rugae; mesopleura polished above and behind, and with a conspicuous longitudinal, indistinctly foveolate depression; propodeum very coarsely rugose; metacarpus distinctly longer than the stigma; the radius slightly longer than the transverse cubitus and uniting with it in a strong angle; posterior coxae smooth and shining; inner spur of posterior tibiae but very slightly longer than the outer and distinctly less than half as long as the metatarsus; abdomen slender, somewhat compressed toward apex; the first tergite but little broader at apex than at base, the sides bulging slightly, the tergite smooth and shining on the basal half, rugulose on the apical half; second tergite short and broad, the sides nearly parallel, the apical margin straight; medially the second tergite is somewhat smooth and shining; third and following tergites smooth and polished; hypopygium extending a little beyond the apex of the last dorsal segment; ovipositor slightly ex-

served. Mostly black; antennal scape testaceous, also the legs, including at least part of the posterior coxae; tegulae very dark testaceous; stigma and veins of forewing pale yellowish-brown; abdomen above, with the exception of the two basal tergites, which are black, largely testaceous; venter of abdomen practically entirely testaceous.

*Male*.—Essentially as in the female, except that the abdominal tergites beyond the second are somewhat black medially.

*Type locality*.—Plainfield, New Jersey.

*Type*.—Cat. No. 22551, United States National Museum.

*Host*.—*Euphydryas phaeton* Drury

Described from seven female and three male specimens bred under Bureau of Entomology No. 5852, July 22, 1893.

#### 152. APANTELES SMERINTHI Riley.

*Apanteles smerinthi* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 311.

*Habitat*.—Missouri; New Hampshire; District of Columbia; New Jersey; Massachusetts; California, Canada. Evidently of very wide distribution.

*Hosts*.—*Smerinthus geminatus* Say; (*Smerinthus*) *Paonias excaecata* Smith and Abbot; *Smerinthus ophthalmicus* Boisduval.

*Cocoons*.—Gregarious, inclosed in a mass of tough silk, white in color.

This species is represented in the National Collection by the following material: The type series; a series from Canobie Lake, New Hampshire, reared from *Smerinthus geminatus*; a series from Washington, District of Columbia, reared from the same host; one specimen from Ottawa, reared by Dr. James Fletcher from *Paonias excaecata*; and several specimens from Los Angeles, California, reared from *Smerinthus ophthalmicus*.

#### 153. APANTELES MURTFELDTAE Ashmead.

*Apanteles murtfeldtae* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 159.

*Habitat*.—Massachusetts; Missouri; Virginia.

*Hosts*.—Unidentified Geometridae.

*Cocoons*.—White, the surface rather uneven; gregarious, but formed separately and without loose silk.

Closely resembles *congregatus*, but differs in having the third abdominal tergite more or less granular on the basal two-thirds.

Besides the types there are in the National Collection 18 specimens reared by R. A. Cushman from a geometrid on rose at Falls Church, Virginia.

## 154. APANTELES GRENADENSIS Ashmead.

*Apanteles grenadensis* ASHMEAD, Trans. Ent. Soc. London, 1900, pt. 2, pp. 277, 278 (not *Urogaster grenadensis* Ashmead, same reference, p. 285).

*Apanteles (Protapanteles) harnedi* VIERECK, Proc. U. S. Nat. Mus., vol. 43, 1912, p. 580.

*Apanteles harnedi* Viereck, VICKERY, Journ. Econ. Entom., vol. 8, 1915, p. 391.

*Habitat*.—West Indies; Mississippi; Texas; Tennessee; Missouri; Florida; widely distributed through the Southern States.

*Hosts*.—*Laphygma frugiperda* Smith and Abbot; *Plathypena scabra* Fabricius; *Cirphis unipuncta* Haworth; *Heliothis obsoleta* Fabricius; *Autographa*, species; *Laphygma exigua* Hübner; *Prodenia eridania* Cramer; *Cirphis latiuscula* Herrich-Schaeffer (Vickery); *C. multilinea* Walker (Vickery).

*Cocoons*.—Yellowish-white; solitary.

Besides the cotypes of *grenadensis* and the types of its synonym the National Collection possesses numerous series of this species. A large part of this material is recorded as reared from *Laphygma frugiperda* in various localities throughout the Southern States. The following rearings from other hosts are indicated, however, from *Plathypena scabra* by C. L. Scott, at Brownsville, Texas, under Webster No. 6412; from the same host at Nashville, Tennessee, by C. C. Hill, under Webster No. 11307, and at Charleston, Missouri, by E. H. Gibson; from *Cirphis unipuncta* by C. L. Scott, at Brownsville, Texas, under Webster No. 6453; from *Heliothis obsoleta* by R. A. Vickery, at Brownsville, Texas, under Webster No. 6437; from *Autographa*, species, by C. L. Scott, at Brownsville, Texas, under Webster No. 6411; from *Laphygma exigua* by R. A. Vickery, at Brownsville, Texas, under Webster No. 6476; from *Prodenia*, species, by R. A. Vickery, at Brownsville, Texas, under Webster No. 6481; and from *Prodenia eridania* by Max Kisiuk, at Allapata, Florida, under Hunter No. 9004.

## 155. APANTELES FISKEI (Viereck).

*Apanteles (Protapanteles) fiskei* VIERECK, Proc. U. S. Nat. Mus., vol. 38, 1910, p. 379.

*Habitat*.—Massachusetts; Wisconsin; Montana.

*Host*.—*Olene*, species.

*Cocoons*.—Gregarious, entirely inclosed in a large mass of white silk.

In addition to the type series there are in the National Collection four specimens reared by R. A. Cooley in Montana from a tussock moth, and three specimens reared under Bureau of Entomology No. 4480° from *Olene*, species, in Wisconsin.

## 156. APANTELES OBSCURICORNIS (Viereck).

*Apanteles (Protapanteles) obscuricornis* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Surv., 1916, pp. 186, 192.

*Habitat*.—Connecticut.

*Host*.—Unknown.

Type in the collection of the Connecticut Agricultural Experiment Station. No other specimens are known to the writer.

## 157. APANTELES MARGINIVENTRIS (Cresson).

*Microgaster marginiventris* CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 67.

*Apanteles marginiventris* CRESSON, ASHMEAD, Trans. Ent. Soc. London, 1900, p. 277.

*Habitat*.—West Indies.

*Host*.—Unknown.

The type material is in the Academy of Sciences at Philadelphia, and has not been examined by the writer.

## 158. APANTELES CHARADRAE, new species.

*Female*.—Length, 2.2 mm. Head indistinctly punctate, shining; antennae shorter than the body; mesoscutum shallowly but distinctly punctate; the disk of scutellum flat, with only a few weak punctures; mesopleura somewhat punctate anteriorly, smooth and shining posteriorly; propodeum entirely rugose and opaque, with a rather distinct median longitudinal carina; radius of forewing longer than the transverse cubitus; posterior coxae smooth and shining, with a conspicuous flattened area having a few punctures within on the outer face above; the posterior femora unusually stout; inner spur of posterior tibiae a little longer than the outer, also a little more than half as long as the metatarsus; abdomen not quite as long as the thorax; the first tergite with the sides rather strongly curved outwardly, the apex hardly broader than the base, the entire plate rugose; second tergite broad, subtrapezoidal, entirely roughened and opaque; remainder of the abdomen smooth and shining; ovipositor sheaths hardly exerted. Black; antennae brown; tegulae yellowish-testaceous; stigma and veins of forewing light brown; all coxae black; remainder of the legs entirely testaceous, except the extreme apex of the posterior femora above, which is slightly dusky; abdomen entirely black above and below.

*Male*.—Like the female except for the longer antennae.

*Cocoons*.—White; gregarious, and held together in a mass within the thin cocoon of the host.

*Type locality*.—Washington, District of Columbia.

*Type*.—Cat. No. 22552, U.S.N.M.

*Host.*—*Uharadra deridens* Guenée.

Described from many specimens of both sexes bred under Bureau of Entomology No. 2603.

159. APANTELES FLAVICORNIS Riley.

*Apanteles flavicornis* RILEY, in Scudder, Butterflies U. S., 1889, p. 1905.

*Habitat.*—Missouri; Texas.

*Host.*—*Thanaos juvenalis* Fabricius (Riley); (?) geometrid.

*Cocoons.*—White; gregarious, held together in masses but not embedded.

Besides the types of this species, there are in the National Collection several specimens from Brownsville, Texas, labeled as having been reared from a geometrid larva.

160. APANTELES MAYAGUEZENSIS (Viereck).

*Apanteles (Protapanteles) mayaguezensis* VIIECK, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 563.

*Habitat.*—Porto Rico.

*Host.*—Unknown.

Known only from the type series in the United States National Museum.

161. APANTELES AMERICANUS (Lepeletier).

*Microgaster americanus* LEPELETIER, Encycl. méthod. Insect., vol. 10. 1825, p. 41.

*Apanteles americanus* Lepeletier, ASHMEAD, Trans. Ent. Soc. London, 1900, p. 277.

*Apanteles mexicanus* ASHMEAD, Proc. Calif. Acad. Sciences, vol. 5, 1895, p. 545.

*Habitat.*—West Indies; Florida; Texas; Western Mexico.

*Host.*—Unknown, but probably large sphingid larvae.

*Cocoons.*—Pure white; gregarious, in enormous masses that are very beautiful.

There can be no doubt that *mexicanus* is identical with *americanus*.

In the National Collection are specimens of this species from Porto Rico reared by August Busck from a sphinx on "papaw"; also a large series from Paradise Key, Florida, reared by C. A. Mosier from a cluster of cocoons on "cabbage palmetto"; and several large series taken at Key West, Florida, by J. V. Harris. The writer has seen also specimens of a large series bred from several cocoon masses taken on tomato plants in Texas.

The location of the types of *americanus* is not certainly known, but they are probably in a European collection. The type series of the synonym is in the National Collection.

## 162. APANTELES SCHIZURAE Ashmead.

*Apanteles schizuræ* ASHMEAD, Proc. Ent. Soc. Wash., vol. 4, 1897, p. 162.

*Habitat.*—New Hampshire; Massachusetts; Connecticut; New York; Virginia; Illinois; Arkansas; Canada. Evidently very widely distributed over the United States and Canada.

*Host.*—*Schizura unicornis* Smith and Abbot; *Schizura*, species.

*Cocoons.*—Pale buff to dirty whitish; gregarious, and arranged parallel, side by side and closely cemented together; they are not inclosed in loose silk.

A large number of series of this species, including the types, are in the National Collection, and show a wide distribution. Several of these series are recorded from *Schizura unicornis*. No other hosts are definitely known, although one large series reared by R. A. Cushman at Falls Church, Virginia, is said to be from a Nctodontid on oak; and two specimens from Bentonville, Arkansas, reared by D. Isely, are from *Schizura*, species.

## 163. APANTELES CONGREGATUS (Say).

*Microgaster congregata* SAY, Boston Journ. Nat. Hist., vol. 1, pt. 3, 1836, p. 262.

*Microgaster utilis* FRENCH, 6th Ann. Rep. South Illinois Normal Univ., 1880, p. 42; Can. Ent., vol. 12, 1889, p. 42.

*Apanteles (Protopanteles) congregatus* Say, VIERECK, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 561.

*Apanteles (Protopanteles) augustus* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Surv., 1916, pp. 187, 194.

*Habitat.*—United States and Canada.

*Hosts.*—(*Phlegethontius*) *Protoparce quinque maculata* Haworth; *P. seata* Johannsen; *Dolba hylæus* Drury; *Ceratonia catalpæ* Boisduval; *Sphinx chersis* Hübner; *Ampeloeca myron* Cramer; *A. versicolor* Harris; *Sphinx kalmiae* Smith and Abbot; *Atreus plebeja* Fabricius; *Pholus pandorus* Huebner; *P. achemon* Drury; *Sphécodina abbotti* Swainson; evidently a very general parasite of *Sphingidae*, but has not been recorded from other families of Lepidoptera.

*Cocoons.*—White; gregarious, but formed separately on the back of the host caterpillar and not embedded in a mass of silk.

The type of *congregatus* no longer exists; but a neotype, which is in the United States National Museum, has been established by Viereck. Apparently *utilis* is a synonym, although it seems likely that French had specimens of two species before him while describing that species. In the opinion of the writer *augustus*, the type of which has been studied, is identical with *congregatus*.

The National Collection contains a vast amount of material of this well-known and widely distributed species. It is not deemed necessary to set forth here the recorded data for this material, since the host records, all of which are included in the above list, are the only matter of significance.

## 164. APANTELES HEMILEUCAE Riley.

*Apanteles congregatus*, var. *hemileuca* RILEY, Trans. Acad. Sci. St. Louis, vol. 4, pt. 2, 1881, p. 309.

*Apanteles (Protapanteles) hemileuca* VIERECK, Bull. 22, Conn. State Geol. and Nat. Hist. Survey, 1916, pp. 188, 195.

*Habitat*.—Missouri; New York; Massachusetts; probably generally distributed over the eastern part of the United States.

*Hosts*.—*Hemileuca maia* Drury; *Automeris io* Fabricius.

*Cocoons*.—As in *congregatus*.

Besides the types the National Collection contains a series of three specimens reared by E. P. Felt from *Hemileuca maia* at Karner, New York. Riley<sup>1</sup> recorded this species from *Automeris io*. Although *hemileuca* had not yet been described at this time, there can be no doubt that this species is meant.

## SPECIES OF APANTELES UNKNOWN TO THE WRITER.

## APANTELES CARPATUS (Provancher) (not Say).

*Microgaster carpatus* PROVANCHER, Natural. Canad., vol. 12, 1881, p. 195.

*Apanteles carpatus* PROVANCHER, Addit. faun. Canad. Hymenop., 1888, p. 388.

*Apanteles ensiger* SAY=(*Apanteles carpatus* Provancher) DALLA TORRE, Catalogus Hymenopterorum, vol. 4, 1898, p. 169.

According to a note by A. B. Gahan, made after an examination of the Provancher collection in the Museum of Public Instruction, at Quebec, the type of this species has been destroyed.

## APANTELES NEPHOPTERICIS (Packard).

*Microgaster nephopteris* PACKARD, Proc. Essex Instit., vol. 4, 1864, p. 122; Amer. Natural., vol. 2, 1868, p. 195.

Although this species was retained in the genus *Microgaster* by Dalla Torre, it appears from the description to be an *Apanteles*. It seems to be very close to *Apanteles ornigis* Weed.

## SPECIES WRONGLY CLASSIFIED AS APANTELES.

The two following species, which were described in the genus *Apanteles*, and until the present retained in that genus, belong in *Microgaster*.

## MICROGASTER XANTHASPIS (Ashmead).

*Apanteles xanthaspis* ASHMEAD, Trans. Ent. Soc. London, 1900, p. 280.

A cotype of this species which is in the United States National Museum has been examined by the writer.

## MICROGASTER RECURVARIAE (Ashmead).

*Apanteles recurvariae* ASHMEAD, Journ. N. Y. Ent. Soc., vol. 11, 1903, p. 144.

A study of the type of this species which is in the United States National Museum shows it to belong to the genus *Microgaster*. It is very near *Microgaster zonarius* and may, in fact, be that species.

<sup>1</sup> Fifth Rep. Insects Missouri. 1873. p. 136.



## HOSTS OF THE SPECIES OF APANTELES.

In the preparation of this list the catalogue of the Lepidoptera of North America, by Barnes and McDunnough, has been followed for the generic names and synonymy.

(?) <i>Acrobasis caryac</i> Grote	-----	<i>Apanteles acrobasisidis</i> Muesebeck; <i>cacocciae</i> Riley.
<i>Aerocercops strigifinitella</i> Clemens	-----	<i>Apanteles rohweri</i> Muesebeck.
<i>Acronycta brumosa</i> Guenée	-----	<i>Apanteles scitulus</i> Riley.
<i>Acronycta hasta</i> Guenée	-----	<i>Apanteles lucticolor</i> Viereck.
<i>Acronycta</i> (?) <i>leporina</i> Linnaeus	-----	<i>Apanteles acronyctae</i> Riley.
<i>Acronycta oblonga</i> Smith and Abbott	-----	<i>Apanteles acronyctae</i> Riley; <i>scitulus</i> Riley.
<i>Acronycta populi</i> Riley	-----	<i>Apanteles acronyctae</i> Riley.
<i>Agapema galbina</i> Clemens	-----	<i>Apanteles clectrae</i> Viereck.
<i>Aglais milberti</i> Godart	-----	<i>Apanteles atalantae</i> Packard.
<i>Agrotis c-nigrum</i> Linnaeus	-----	<i>Apanteles arylinus</i> Say; <i>yakutatensis</i> Ashmead.
<i>Alabama argillacea</i> Hübner	-----	<i>Apanteles aletiae</i> Riley.
<i>Alsophila pomctaria</i> Harris	-----	<i>Apanteles paleacritae</i> Riley.
<i>Ampeloeca myron</i> Cramer	-----	<i>Apanteles congregatus</i> Say.
<i>Ampeloeca versicolor</i> Harris	-----	<i>Apanteles congregatus</i> Say.
<i>Anisota senatoria</i> Smith and Abbot	-----	<i>Apanteles anisotae</i> Muesebeck.
<i>Anomis crosa</i> Hübner	-----	<i>Apanteles bedelliae</i> Viereck.
<i>Anthocharis genutia</i> Fabricius	-----	<i>Apanteles flaviconchae</i> Riley.
<i>Argynnis cybele</i> Fabricius	-----	<i>Apanteles argynnidis</i> Riley.
<i>Argynnis</i> , species	-----	<i>Apanteles argynnidis</i> Riley.
(?) <i>Argynnis</i> , species	-----	<i>Apanteles luteipennis</i> Muesebeck.
(?) <i>Argyresthia</i> , species on oak	-----	<i>Apanteles betheli</i> Viereck.
<i>Aristotelia fungivorella</i> Clemens	-----	<i>Apanteles aristoteliae</i> Viereck.
<i>Atreus plebeja</i> Fabricius	-----	<i>Apanteles congregatus</i> Say.
<i>Autographa brassicae</i> Riley	-----	<i>Apanteles autographae</i> Muesebeck; <i>laeviceps</i> Ashmead.
(?) <i>Autographa brassicae</i> Riley	-----	<i>Apanteles glomeratus</i> Linnaeus.
<i>Autographa gamma</i> , var. <i>californica</i> Geyer	-----	<i>Apanteles yakutatensis</i> Ashmead.
<i>Autographa</i> , species	-----	<i>Apanteles grenadensis</i> Ashmead; <i>laevi-</i> <i>ceps</i> Ashmead.
(?) <i>Automeris io</i> Fabricius	-----	<i>Apanteles hemileucaae</i> Riley.
<i>Basilarchia archippus</i> Cramer	-----	<i>Apanteles limenitidis</i> Riley.
<i>Bedellia minor</i> Busck	-----	<i>Apanteles bedelliae</i> Viereck.
<i>Bedellia somnulentella</i> Zeller	-----	<i>Apanteles bedelliae</i> Viereck.
<i>Bucculatrix pomifoliella</i> Clemens	-----	<i>Apanteles cacocciae</i> Riley.
<i>Bucculatrix</i> on oak	-----	<i>Apanteles bucculatricis</i> Muesebeck.
<i>Cacoccia argyrospila</i> Walker	-----	<i>Apanteles gillettei</i> Baker.
<i>Cacoccia rosaceana</i> Harris	-----	<i>Apanteles polychrosidis</i> Viereck.
<i>Cacoccia semiferana</i> Walker	-----	<i>Apanteles cacocciae</i> Riley.
<i>Calocalpe undulata</i> Linnaeus	-----	<i>Apanteles hydrae</i> Muesebeck.
<i>Calpodcs ares</i> Felder	-----	<i>Apanteles prenidis</i> Muesebeck.
<i>Carpocapsa toreuta</i> Grote	-----	<i>Apanteles laspyresiae</i> Viereck.
<i>Ceratonia catalpae</i> Boisduval	-----	<i>Apanteles congregatus</i> Say.
<i>Charadra deridens</i> Guenée	-----	<i>Apanteles charadrae</i> Muesebeck.
<i>Chlorochlamys chloroleucaria</i> Guenée	-----	<i>Apanteles nemoriae</i> Ashmead.
<i>Choreutis carduiella</i> Kearfott	-----	<i>Apanteles choreuti</i> Viereck.

<i>Chorizagrotis agrestis</i> Grote	.....	<i>Apanteles laeviceps</i> Ashmead.
<i>Chorizagrotis auxilaris</i> Grote	.....	<i>Apanteles laeviceps</i> Ashmead.
<i>Chorizagrotis</i> , species	.....	<i>Apanteles alticola</i> Ashmead; <i>militaris</i> Walsh.
<i>Cirphis latiuscula</i> Herrich-Schaeffer	.....	<i>Apanteles grenadensis</i> Ashmead.
<i>Cirphis multilinea</i> Walker	.....	<i>Apanteles grenadensis</i> Ashmead.
<i>Cirphis phragmatidicola</i> Guenée	.....	<i>Apanteles militaris</i> Walsh.
<i>Cirphis unipuncta</i> Haworth	.....	<i>Apanteles flaviconchae</i> Riley; <i>forbesi</i> Viereck; <i>grenadensis</i> Ashmead; <i>laeviceps</i> Ashmead; <i>militaris</i> Walsh; <i>rufocoxalis</i> Riley.
<i>Cosymbia lumenaria</i> Huebner	.....	<i>Apanteles paleacritae</i> Riley.
<i>Crambus mutabilis</i> Clemens	.....	<i>Apanteles crambi</i> Weed.
<i>Crambus trisectus</i> Walker	.....	<i>Apanteles crambi</i> Weed.
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